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## **FOREWORD**

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This document articulates a strategic blueprint of the key structural elements that will shape Treasury Communications System (TCS) implementation. In addition to defining strategic directions prior to contract award to accelerate their implementation, this plan establishes processes for continued TCS strategic planning and the measuring of accomplishments.

The TCS will build upon Treasury's Consolidated Data Network (CDN). The CDN was established in the mid-1980s to meet recognized needs for a department-wide data communications system. Rapid technological developments and changing bureau requirements, as well as Electronic Government initiatives, indicated that the CDN replacement network should be considered a service-based utility. TCS will represent a new paradigm in networked information services, processing, and support--the concept of the network as a major component of an information infrastructure. It also represents a new paradigm in work processing--the concept of virtual agencies organized around common service themes rather than around bureaucratic structures. This latter concept is the essence of Electronic Government. Its realization will require a long-range, cross-organizational perspective with improved services to U.S. citizens as the major objective.

This strategic planning initiative taken by the Treasury Department anticipated the National Performance Review (NPR) recommendation that Treasury take a leadership role in achieving the objective of Electronic Government. The strategic blueprint contained herein describes the corporate visions of future capabilities and innovations in network-based computing services that will position the TCS to be a key conduit in the Government Services Information Infrastructure (GSII). The TCS will also become an essential public sector contributor to the National Information Infrastructure (NII).

Strategic planning sets the framework for long and short term goal achievement and implementation planning. This is especially true in a dynamic environment. Strategic planning enables the pro-active management of change. Strategy becomes the change agent rather than the change victim. All Treasury bureaus will be affected by change, whether that change is related to budget, technology, mission requirements, information system plans, or the transition to the TCS. Since a certain synergy may be derived from collectively identifying where change should occur, a Core Team of representatives from each Treasury Bureau was formed. Using a multi-stage strategic planning process, the Core Team reached consensus on 12 corporate visions that describe services that the TCS will offer so that bureaus can better leverage technology to accomplish mission objectives. In addition, these services will enable bureaus to be flexible in their response to the dynamic business environment.

The Core Team reached consensus on the strategic directions, or actions that will bring their corporate visions into reality. Through a collaborative and iterative process, Core Team members participated in work sessions to prepare this blueprint. Their tasks will continue, as they evaluate and measure the accomplishments associated with each strategic direction. In order to make these corporate visions become reality, key decisions are required, as well as the

commitment of top management to implement the strategic directions.

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## **ACKNOWLEDGMENTS**

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All Treasury bureaus are due thanks for their support in the development of this TCS Strategic Plan. Their willingness to lend valuable personnel for participation on the TCS Strategic Planning Core Team and in work sessions, interviews, and document reviews was essential to creating a TCS blueprint for planning based on consensus. The names of all Core Team members are listed in Appendix D.

Acknowledgment is also owed to the industry experts and Treasury Department executives who contributed their time to the development of the TCS Strategic Plan. Industry experts facilitated interactive work sessions during which they presented observations on industry and marketplace trends, while TCS Core Team members pointed to trends or requirements within their bureaus. Department executives provided high level overviews on bureau strategic directions and guidance with respect to the general tone and level of analysis appropriate to this document.

Building consensus on corporate strategy within a complex department composed of numerous independent organizations was challenging. The strategic planning process used by the Core Team provided a means of addressing organizational diversity, and it was developed to accommodate changing conditions and requirements.

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## **EXECUTIVE SUMMARY**

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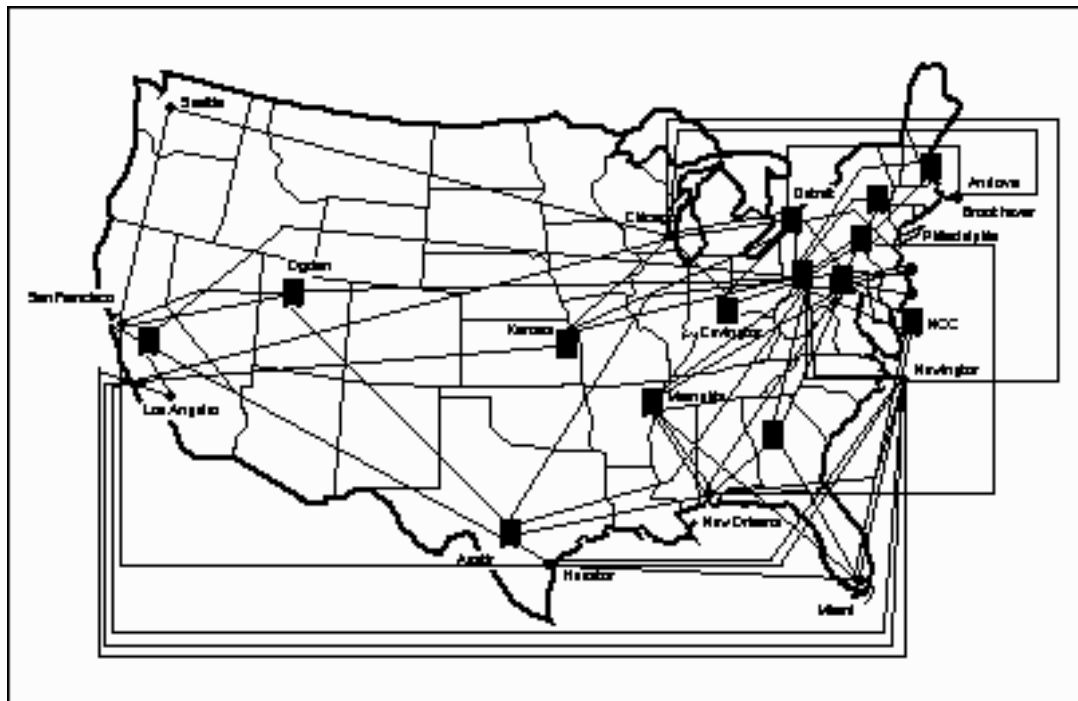
### **Introduction**

The potential range of services offered by the Treasury Communications System (TCS) is immense and varied, in keeping with the diversity of missions that characterizes the Department of the Treasury itself. Treasury has taken the initiative within the civilian Federal Government to leverage emerging telecommunications technologies to empower its personnel with superior access to information resources. Such access supports the development and implementation of improved workflow management and business processes. Also it will improve the professional capabilities of Treasury personnel by making training and other common services more readily available, efficient, and customized. Most important, this initiative will enable the Treasury Department to better serve its citizen customers by accommodating and promoting access by the public to government information and services.

The urgent need to satisfy expanding business objectives within the context of tightened budgetary constraints was a key driver for the TCS Strategic Planning Project. This need also defined the project's purpose, to identify the strategic directions necessary to build a Treasury Information Infrastructure (TII) that would enable flexible and reengineered business processes for the future. The computing and information services provided through the TCS will answer the business needs of many other civilian agencies, especially those that interface directly with Treasury and indirectly with U.S. citizens. Examples of intra/intergovernment business needs are the Simplified Tax and Wage Reporting System (STAWRS) and the International Trade Database Systems. In forming the TCS as the major conduit for the TII, Treasury will also position itself to connect to the proposed Government Services Information Infrastructure (GSII) as a key Government component. The latter coincides with recommendations from the National Performance Review (NPR). TCS will build upon existing experiences with, and capabilities of, the Consolidated Data Network (CDN) to anticipate bureau needs, evaluate pilot programs, and identify promising technologies.

### **CDN as the Foundation for the TCS**

Implementation of the TCS and bureau adoption of new functionality will be simplified because of the significant preparation already provided by the CDN. Comprised of more than 175 nodes and 2,000 network access devices, in addition to other data communications equipment, CDN stretches from coast-to-coast in the continental U.S., as indicated in the Exhibit, "Current Continental U.S. CDN Node Network." Other CDN network nodes include Alaska, Hawaii,

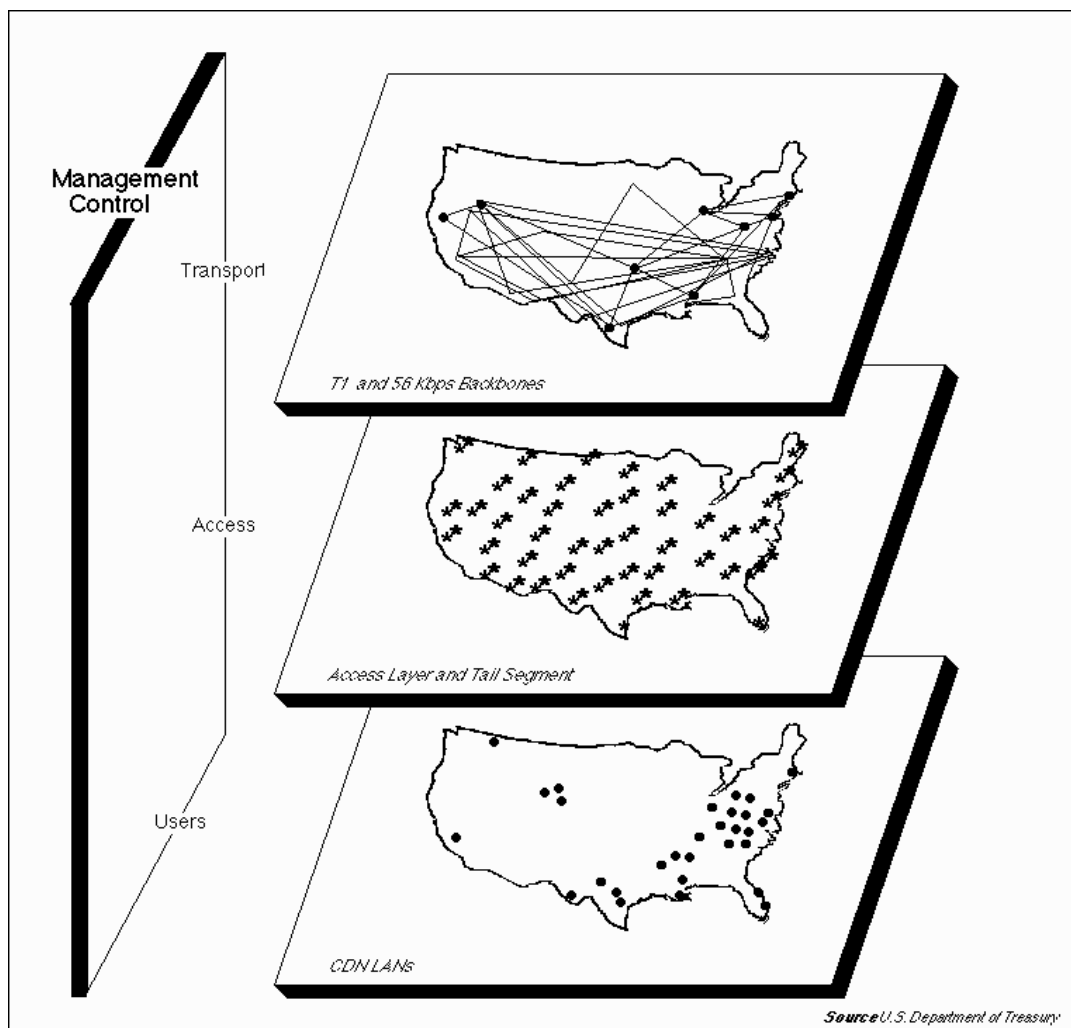


**Current Continental U.S. CDN Node Network**

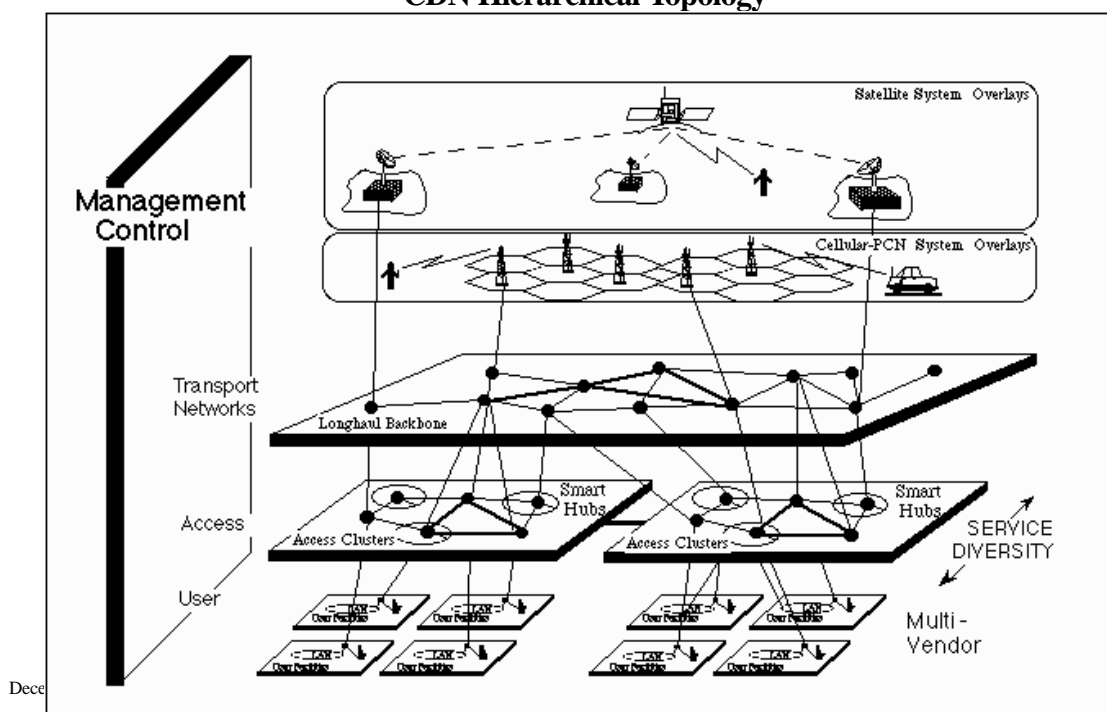
Puerto Rico, Canada, and Guam. CDN is the largest secure, private Wide Area Network (WAN) in the U.S. civilian government. In addition to the robust telecommunications infrastructure offered by the CDN, bureau experience with the CDN will help make their transition to TCS technology easier.

CDN offers a hierarchical topology that makes available a range of technology that reflects the diverse business needs of users. The TCS will build on the robust CDN connectivity to develop not only a telecommunications infrastructure but an information infrastructure that integrates the cost-effective capabilities offered through FTS2000 and network-based computing services. The resulting communications paths will transport data and applications to the user as needed. Applications may include training programs as well as "bundled" software products that correspond to different information services offered over TCS. Most of the telecommunications infrastructure requirements for TCS have already been met by CDN. It is the information services that will combine with the expanded CDN telecommunications infrastructure that will define the TCS. Note the Exhibits "CDN Hierarchical Topology" and

“TCS Integrated Network Topology.”



**CDN Hierarchical Topology**



**TCS Integrated Network Topology**



Given the firm foundation offered by CDN, TCS strategic planning can be directed toward integrating the applications and business components essential for creating a multidimensional information service utility. A strategic approach is necessary to match business needs with changing technological capabilities. The TCS Request for Proposal (RFP) was a functional specification, identifying traffic, interfaces, and applications to be supported. It did not specify technical and product solutions. TCS will offer a major information technology resource which will be responsive to changing business processes and conditions.

## **TCS and the Changing Environment**

The operating environment for the Treasury Communications System (TCS) will be dynamic. The TCS infrastructure must be flexible enough to accommodate redefined requirements and allow Treasury to harness new technologies as they become available.

Some of the changes in the dynamic environment include increasing demand for interoperable systems, expanded use of client/server applications, and the rapid growth of Electronic Commerce. Collaboration and gains in group productivity through workflow management are expanding in the areas of accounts processing and law enforcement. In addition, workers are placing more and more reliance on laptops and hand-held computers to access distant information sources to perform their jobs.

Speaking on the changes in communications, Vice President Gore has said, "This Administration intends to create an environment that stimulates a private system of free-flowing information conduits." In order to achieve this, the NPR identified Agency telecommunications networks as major components of the Government Services Information Infrastructure (GSII) and key enablers for the reengineering of business processes. TCS will also benefit other Government agencies, creating a model and a capability for GSII.

The Government Information Technology Services (GITS) Working Group recently issued its plans to fulfill NPR recommendations for using information technology. Many of the strategic directions identified in this document detail specific actions necessary to satisfy items on the GITS agenda for high-profile interagency technology programs. The strategic directions also respond to NPR recommendations that the Treasury Department take a leadership role in providing the migration path to integrate tax and entitlement reporting and payment, linking law enforcement agencies and public safety, developing an International Trade Data System, and promoting Electronic Commerce.

## **Addressing Change**

Technology is changing rapidly, and the procurement process is often too ponderous to

anticipate technical solutions to tomorrow's needs. Managing change is critical. The primary purpose of the TCS Strategic Planning Project was to develop strategies for managing change in a pro-active manner. As a service-based utility, TCS will provide the potential resources to address the plethora of changes that arise in meeting the corporate missions of each bureau. This does not mean that all organizations must make changes at the same time and to the same degree. The particular combination of resources or services used will vary according to each bureau's objectives, constituency, and business/work culture. Defining the TCS according to strategic directions allows maximum flexibility for solutions to bureau requirements. Certain commonalities do exist across all bureaus, however. All bureaus are concerned with containing cost and optimizing productivity. TCS offers economies of scale for meeting cost goals, while providing timely and innovative technology to enable changes in work flow processes as appropriate. The billing rate structure for TCS will be equitable and based on the set of information services used to meet bureau business needs. In addition, as telecommunications management and information services are integrated, TCS will provide adequate capability for the redundancy and backup essential to ensure continuance of each bureau's mission-critical business.

Government initiatives and market trends are also driving changes in the way Government business is performed. The anticipated changes and demands for services have already begun. The existing CDN is responding to some of these and is preparing for TCS development.

Some changes may be initiated due to externally defined needs, such as Presidential mandates for Government-wide electronic mail and directory services. Others, such as the desire for multimedia capabilities and telecommuting, are being identified by internal Treasury users. Preparation for change is heralded by the convergence of technology (especially given price and performance developments), redefined enterprise success factors (such as alternative ways of filing for U.S. taxpayers), and fiscal realities (usually in the form of reduced budget allocations).

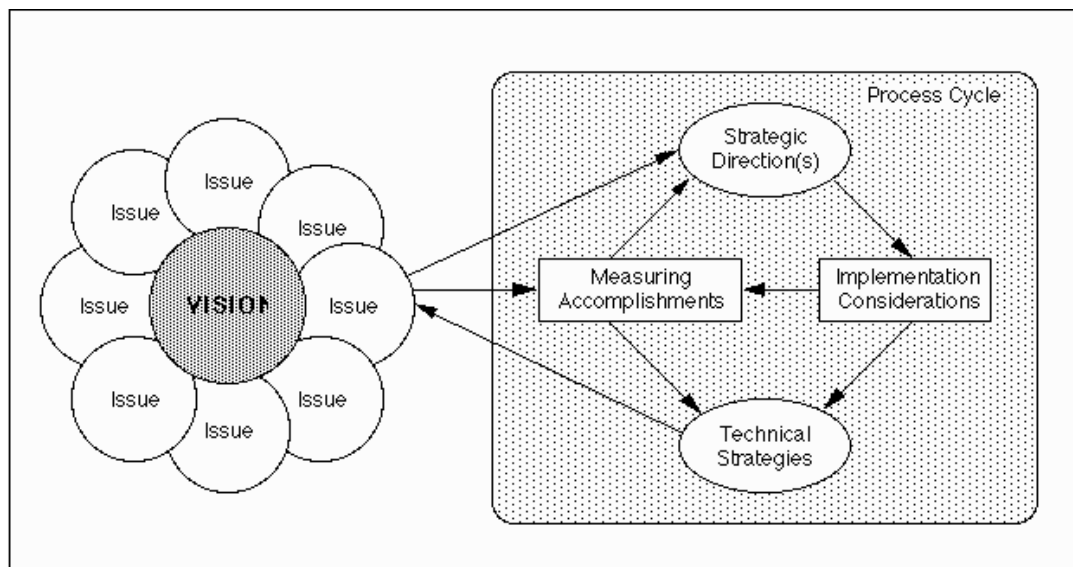
The set of communications/information services described in this plan respond to the visions of desired future capabilities that were articulated by representatives from Treasury bureaus. Various vision elements, such as interoperability, seamless connectivity, citizen privacy, and transparent access to remote databases, suggested the need for specific service offerings. They also indicated the value of the TCS enterprise network to include Treasury Information Service Centers (TISCs) for combining telecommunications services with computer resources for access control and distribution of information.

## **The Process**

The TCS Strategic Planning Project involved a highly interactive and iterative process that was developed and coordinated by T.J. McKeown and Associates, Ltd. The Exhibit, "Strategic

Planning Process Cycle,” illustrates the major steps that were followed. Representatives from all Treasury bureaus contributed to the articulation of visions, or desired capabilities, and to the identification of issues and strategic directions for the future implementation of the visions, based on consensus. The visions, issues, and strategic directions form the foundation of the TCS Strategic Plan.

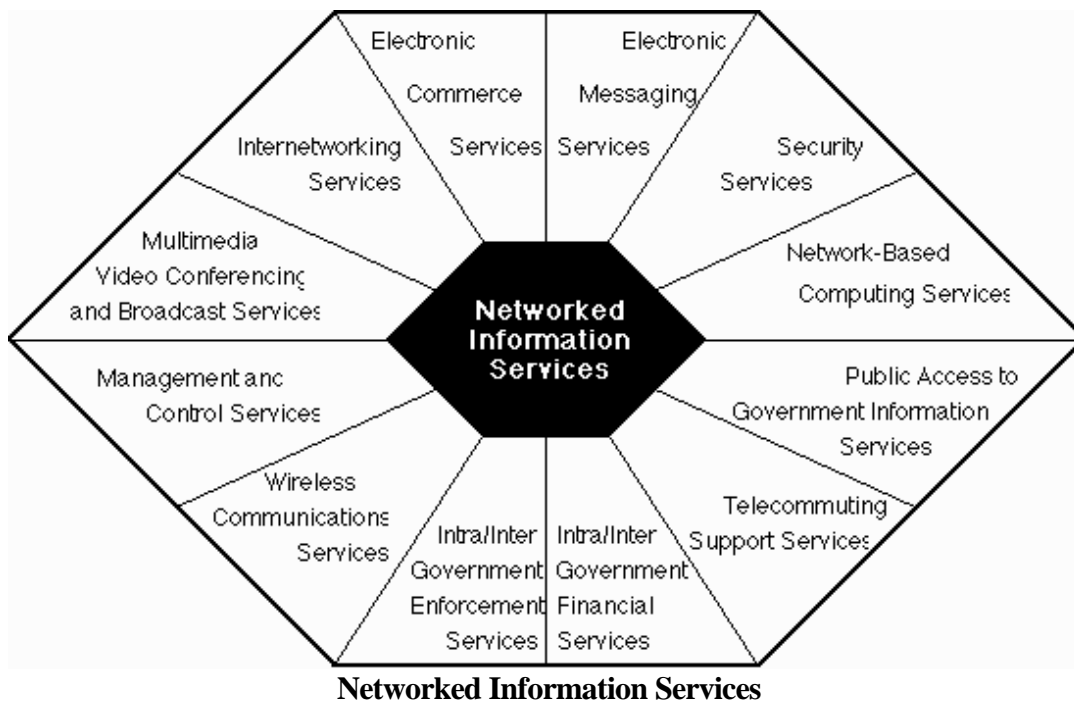
Representatives from each of the bureaus formed a Core Team that researched and identified



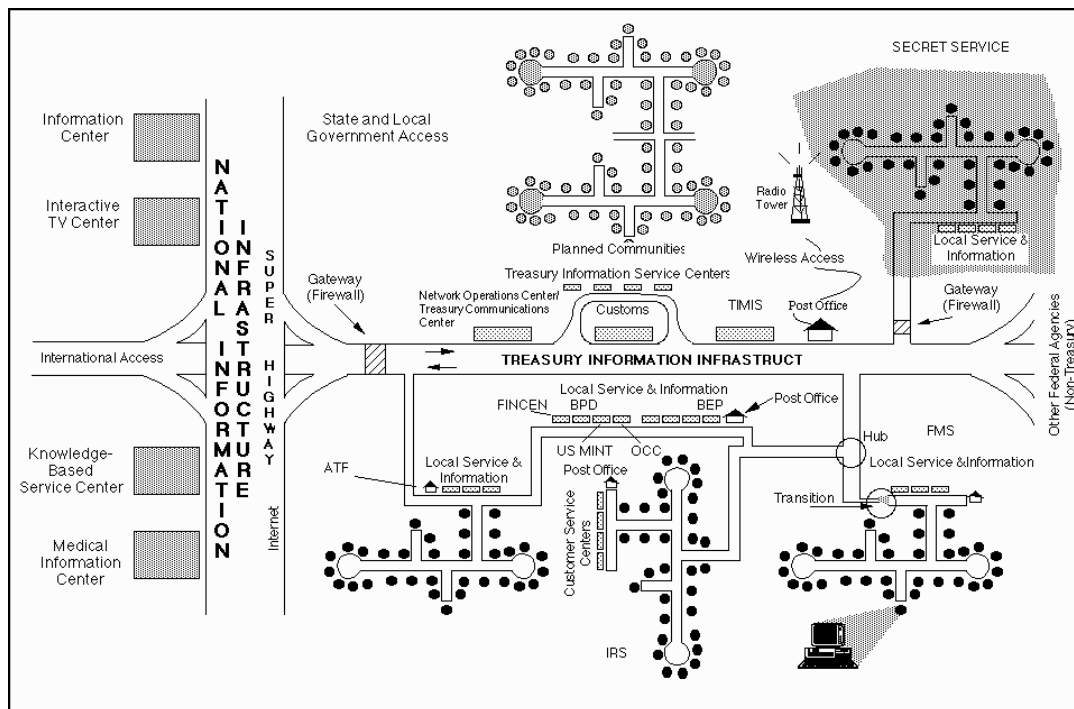
**Strategic Planning Process Cycle**

the key telecommunications and information technology capabilities required to support bureau mission statements, strategic plans, business plans, Information System Plans (ISPs), and other Treasury organizational mandates. From these, the Core Team identified over 25 visions, which were later consolidated into a set of 12 corporate visions. Issues associated with achieving these visions were identified in Core Team work sessions. Specific actions, or strategic directions, for achieving each vision were then identified. The team addressed some of the implementation considerations associated with each strategic direction, such as standards, technology, scheduling, and other similar factors. Also, the Core Team addressed the main factors that would guide the measuring of accomplishments.

The Exhibit, “Networked Information Services,” depicts 12 corporate visions. Only the key strategies pertaining to each of the corporate visions are included in this Executive Summary. Additional strategic directions and more detail can be found in the basic plan (pp. 1 through 84).



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**Treasury Information Infrastructure Analogy**

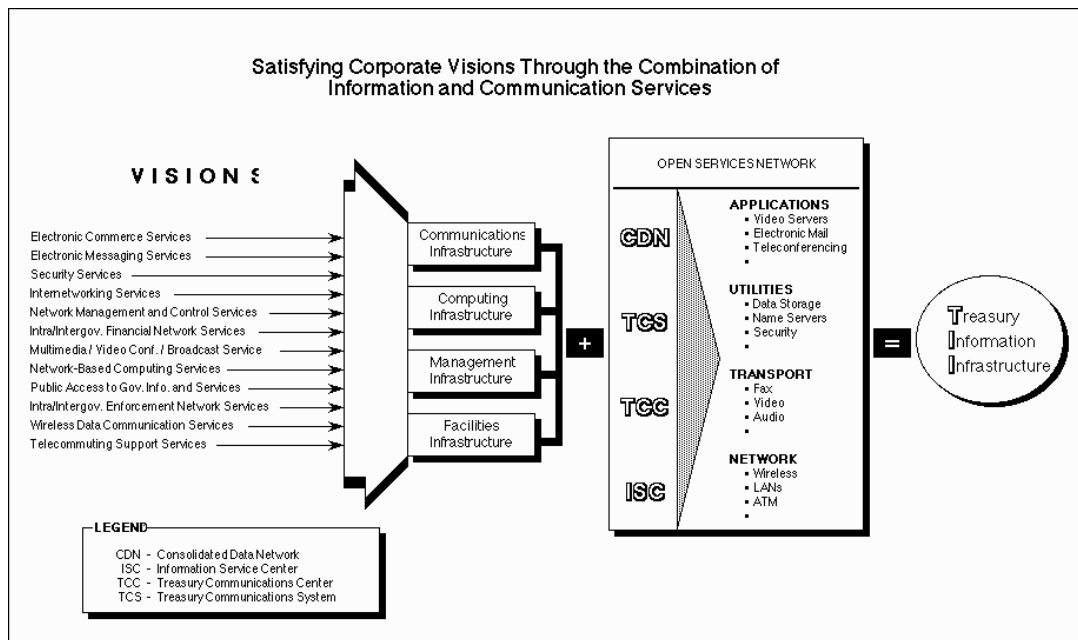
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## **A TREASURY INFORMATION INFRASTRUCTURE**

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The TCS corporate visions identify a variety of value-added network-based services combining telecommunications and computers that define an overall vision of a Treasury Information Infrastructure (TII).

As seen in the Exhibit, “Treasury Information Infrastructure: Satisfying Corporate Visions through the Combination of Information and Communication Services,” the TII fully incorporates CDN and TCS capabilities in the TCS Communications Center(s) and the Treasury Information Service Center(s) providing for network control, access, and distribution of TCS services. The TII is a multidimensional composition of infrastructures, encompassing communications, computing, management, and facilities within an open, multilayered network approach.



**Treasury Information Infrastructure: Satisfying Corporate Visions Through the Combination of Information and Communication Services**

The TII supports an open and layered approach facilitating the provision and management of

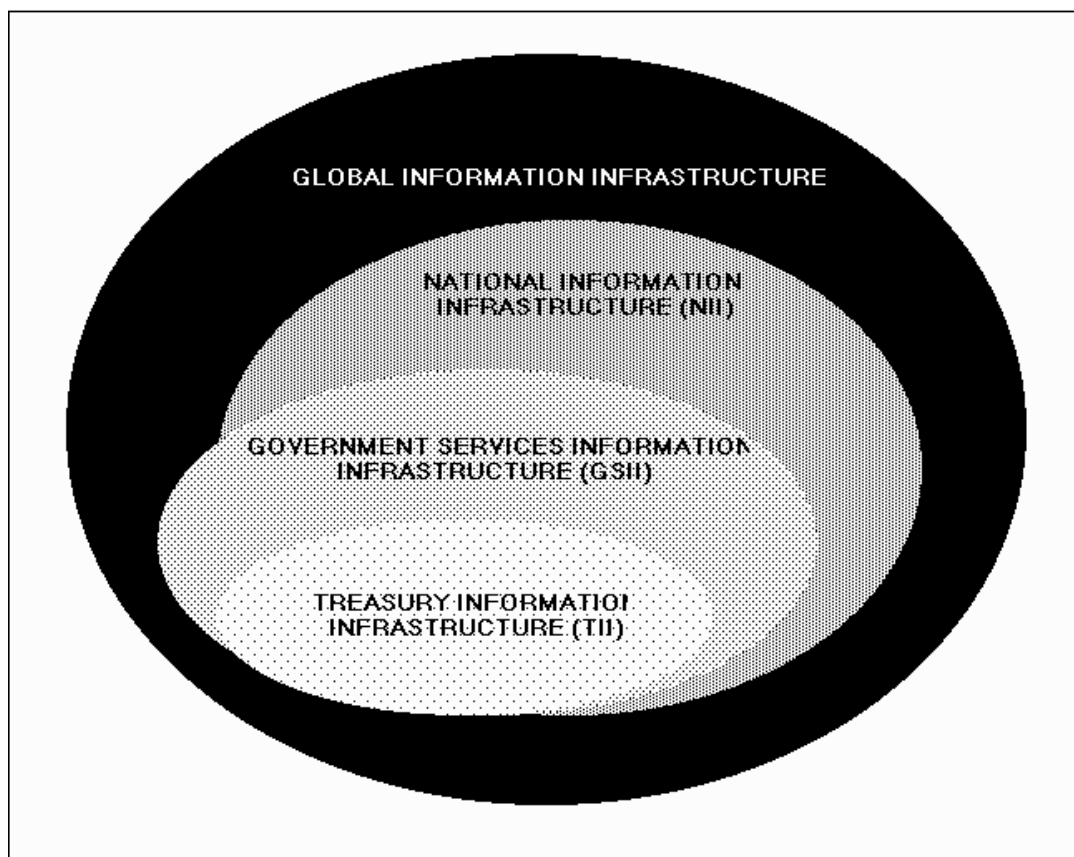


various services for the user at the network access points, while minimizing the impact of change on the entire infrastructure.

The layers of the open network approach of the infrastructure for the TII are: Network, Transport, Utilities (middleware), and Applications. A key objective of the TII is to provide universal controlled access for users, while at the same time remaining flexible to accommodate changes by network providers, service providers, and technology upgrades, with minimum or no impact.

The TII will meet the Administration's intention to create an environment that stimulates free-flowing information conduits. In addition, the TII will clearly demonstrate the National Performance Review (NPR) identification of agency telecommunications networks as major components of the Government Services Information Infrastructure (GSII). More than a simple network procurement to replace CDN, TCS represents a new paradigm in government workflow management, the concept of virtual agencies organized around service themes.

The TII must coexist and function within a larger infrastructure represented by the Global Information Infrastructure (GII), the National Information Infrastructure (NII), and the Government Services Information Infrastructure (GSII). These infrastructures, and particularly the TCS, must be open to allow internetworking of services and capabilities in a seamless



fashion. This relationship is shown in the Exhibit, "Relating GII, NII, to GSII and TII," which illustrates the interdependency of these various infrastructures in providing an ever-wider array of information services within the global community.

Treasury is one of the largest Federal Government agencies, counting among its customers all U.S. citizens. The ways in which U.S. citizens and Treasury personnel use the information/communications potential embodied in the TCS will, over time, continue to define the TCS. The network and its information services capabilities will also be flexible enough to respond to the needs of other Governmental agencies (Federal, State, local), non-governmental institutions and organizations, and international entities. Their use of TCS will also help articulate its ultimate form and service offerings as the Treasury Department evolves into a model implementation, perhaps even the structural framework, of the "Electronic Government" concept.

The Exhibit "Treasury Information Infrastructure Analogy" has been developed to depict the analogous relationship between the Treasury Information Infrastructure and a community's infrastructure within which typical TCS users reside. A detailed explanation of the relationship and the exhibit are contained in the section of the basic document entitled, "A Treasury Information Infrastructure."

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## THE CORPORATE VISIONS

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### Electronic Commerce Services

#### VISION

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*Electronic Commerce Services offer an integrated set of capabilities that TCS users may adapt to reengineer acquisition, payment, and tax-related business processes, thereby increasing productivity, reducing paperwork, and saving time in transacting business with Trading Partners.*

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The President's plan for Electronic Commerce calls for all Federal agencies and vendors to process solicitations, purchase orders, invoices, contract amendments, and payments on a government-wide EDI system. Due to its prominent position with respect to international trade and the banking industry, Treasury is well positioned to be the focus for Government Electronic Commerce activities.

#### KEY STRATEGIES

- Configure the existing CDN to serve a selected set of EDI requirements for Treasury.
- Build Electronic Commerce capabilities within the TCS that will enable Treasury and other designated government agencies to reengineer business processes and comply with the President's plan.
- Take a leadership role in Electronic Commerce development within government, especially by formulating EDI acquisition plans and policies in cooperation with the General Services Administration (GSA). The TCS must be prepared to support any Treasury Electronic Commerce procurement and other initiatives, including participation on the Electronic Commerce Acquisition Team (ECAT).

## Electronic Messaging Services

### VISION

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*Electronic Messaging Services will build the essential infrastructure to link all TCS users, creating communications media that exemplify the Electronic Government.*

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The provision of Electronic Messaging Services answers the Federal mandate to implement government-wide E-mail. It also enables the achievement of several other visions, such as Electronic Commerce Services and Network-Based Computing Services.

### KEY STRATEGIES

- Establish messaging standards for the TCS that are consistent with U.S. and international commercial practices. The recommended standards today include the most widely accepted X.500, 1988 X.400, and Internet Mail (Simple Mail Transfer Protocol/Multipurpose Internet Mail Extension [SMTP/MIME]).
- Enable a protected and highly secure access to Internet, World-wide Web, and bulletin board/kiosk information resources for the benefit of the Treasury Department, its personnel and customers. Leverage the connectivity offered by FTS2000 and LTSS to increase bandwidth availability and reduce cost.
- Establish E-mail Conversion Services that will convert facsimile and other media to E-mail and allow communication between different E-mail systems.

## Internetworking Services

### VISION

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*Through Internetworking Services, TCS users will freely interoperate with multiprotocol networks and applications, taking full advantage of information resources available through the National and Government Services Information Infrastructures.*

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Internetworking Services will allow the creation of virtual agencies based on different missions but sharing a common information infrastructure. For example, the NPR touted the benefits to U.S. citizens from integrated, electronic tax reporting, sharing interagency enforcement data and entitlement processing.

### KEY STRATEGIES

- Take an incremental approach to change, in accordance with the availability of reliable internetworking technologies and based on user requirements. Promote connection to the network first, then migrate groups to an inter-operable suite of products.
- Set clear and unequivocal policy directions on standards so that information system changes made are consistent with the standard. Avoid the temptation to grant waivers to the standard and to force preemptive conversion to the standard. In addition, freedom at Open Systems Interface (OSI) model levels three and four should be limited.
- Define critical networks outside Treasury to which connectivity is required. Such networks would include the Defense Information Systems Network (DISN) and the Simplified Tax and Wage Reporting System (STAWRS).

## Security Services

### VISION

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*The integrity, confidentiality, and availability of the TCS network and those information resources, products, and activities encompassed within TCS will be ensured by Security Services, with full accountability to the level of the individual user and/or transaction.*

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Security Services are critical to ensure the availability, integrity, and confidentiality of information contained within the TCS network and at information sources connected to the TCS. Marketplace trends show increasing recognition that encryption and authentication mechanisms, such as digital signature, are necessary to reduce the vulnerabilities associated with large and complex distributed networks.

### KEY STRATEGIES

- Establish a Treasury organization responsible for the oversight of the TCS Security Services to ensure that the implementation and application of security utilities are consistent with current policy and related directives. This should include training, risk assessments, and approval or certification of security service for the organization being supported.
- Formulate policies for Security Services associated with the TCS. Such policies would offer user organizations electronic key distribution, firewall implementations, and special auditing as services of the network. Policy should emphasize the centralization of security maintenance, training, and other overhead processes of a secure transport system. User organizations should maintain the control and management of critical information as related to the security of their particular application or network domain. Common applications should share common methods of protection.
- Evaluate public access programs such as TeleFile to identify measures that could be taken to protect it from improper access or the use of any information that, although not appropriate for general dissemination, is nonetheless transmitted electronically.

## Network Management and Control Services

### VISION

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*TCS users will benefit from pro-active problem isolation, diagnostics, and dynamic reconfiguration as Network Management and Control Services allow a composite view of the entire system, with segmented domain administration and service privileges as required by individual agencies.*

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The TCS network management system is to be built incrementally, following an open management platform architecture. Emphasis should be placed on the adoption of the Simple Network Management Protocol (SNMP), now available as version 2.

### KEY STRATEGIES

- Adopt a hierarchical multi-domain network management system based on an Open Management Platform Architecture. This architecture could allow connection to independent local management consoles and the use of SNMP to all TCS devices and carrier management services. Migrate the entire enterprise to a single network management platform standard over time.
- Build the TCS network management system incrementally, adding functionalities and relevant software to the system as they become available. Choose management products that represent the “best of breed,” rather than opting for a single source provider of all management products. The best management system will be a heterogeneous mix of software products guided by a unified standards process.
- Implement end-to-end network management oversight, while recognizing the need to segment site level operations/management domains in response to an organization's security and business needs. The resulting management structure will be hierarchical at the management domain level and peer-to-peer at the site level.



## **Intra/Intergovernmental Financial Network Services**

### *VISION*

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*Treasury will enhance its leadership role in the virtual networks created by local, State, and Federal government entities by using Intra/Intergovernment Financial Network Services to electronically deliver benefits, process tax- and duty-related information, and coordinate a full range of banking activities.*

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Treasury will respond to NPR recommendations and its own business goals by developing Intra/Intergovernmental Financial Network Services to further support the electronic exchange of financial transactions and information. Establishing such a network capability is especially dependent upon the success of realizing the visions concerning electronic commerce, electronic messaging, internetworking, and security.

### *KEY STRATEGIES*

- Establish a Treasury-wide Financial Network User Group to define the systems and associated services within the Department that can be supported by the TCS. Evaluate, in particular, the Simplified Tax and Wage Reporting System as an example of intra/interorganization cooperation.
- Select the initiatives within the commercial EDI conventions relating to financial transactions that could be incorporated into the TCS. Participate in Electronic Commerce Acquisition Team (ECAT) activities.
- Coordinate with the National Institute of Standards and Technology (NIST) and members of the financial community to establish standard procedures and mechanisms for using digital signature technology for financial applications. Include use of digital signatures for public access and user certification.

## **Multimedia/Video Conferencing/Broadcast Services**

### *VISION*

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*TCS users will select convenient desktop and group alternatives for information exchange, conferencing, and training, by selecting from an extensive array of state-of-the-art technologies, available through Multimedia/Video Conferencing/Broadcasting Services.*

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The network architecture to support Multimedia/Video Conferencing Broadcast Services should follow user applications and be the natural derivative of user requirements. Operational efficiencies, economies of scale, and management control can be improved through the use of TCS consolidated services.

### *KEY STRATEGIES*

- Establish a Treasury-wide Multimedia/Video Conferencing/Broadcast Services Working Group to identify Treasury Department success factors and technology price/performance scenarios prior to planning multimedia service offerings. The service offerings of the TCS will address the ability of the user organizations to accommodate bandwidth demands. Coordinate the use of FTS2000 and LTSS capabilities to increase available bandwidth as cost-effectively as possible.
- Leverage Treasury's visibility to form government/industry strategic alliances to develop alternatives for major applications as part of a standards development process. TCS management should maintain awareness of evolving technology and keep appropriate organizations apprised of capabilities as they develop.
- Implement a variety of common, instructional programs for Treasury personnel.

## Network-Based Computing Services

### VISION

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*Network-based Computing Services will empower TCS users with privileged access to a menu of information and computing resource tools, through value-added Core and Extended Services that include standards-based messaging and directory capabilities, shared databases, and security protection.*

---

Treasury will realize information management efficiencies by centralizing network-based computing resources. For users, this set of capabilities will establish the TCS paradigm as a service-based utility.

### KEY STRATEGIES

- Establish an initial Treasury Information Services Center(s) (TISCs) that will integrate management of TCS network-based computing resources, transmission connectivity, and security and network management. The center(s) should be located with the Treasury Communications Center (TCC) to maximize service quality and minimize resource expenditures.
- Incorporate several Network-based Computing Services by identifying and implementing service offerings that are applicable to most agencies, such as public access to government information, training, and telecommuting. Evaluate the inclusion of specific service offerings on the basis of results from experimental implementation, such as pilot programs, proofs of concept, and models/simulations.
- Select from some of the services recommended in the Open Systems Forum (OSF) Distributed Computing Environment (DCE) and incorporate these incrementally.

## Public Access to Government Information Services

### VISION

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*TCS users will respond to the American public's desire and need for user-friendly, accurate, and confidential Public Access to Government Information Services by using different combinations of TCS service capabilities.*

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Public Access to Government Information and Services will support the “outreach” aspect of an Electronic Government, to better serve the U.S. citizen and disseminate information more easily and efficiently, using a variety of communications media.

### KEY STRATEGIES

- Sponsor an inter-bureau initiative to assess the feasibility of, and formulate an approach to, using a single mechanism for implementing multiple access methods for the public to obtain Treasury information.
- Establish the Internet and World-wide Web (WWW) as two primary methods of supporting public access to Treasury and other government information.
- Define a TISC infrastructure and design a technical architecture for distributing and controlling access to Treasury Department information and services designated for the public.
- Evaluate existing public access programs, such as TeleFile, to identify measures that could be taken to protect information made available electronically from improper access or use.
- Provide 800 services, kiosks, and bulletin board access as required.

## **Intra/Intergovernment Enforcement Network Services**

### *VISION*

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*Intra/Intergovernment Enforcement Network Services will leverage the best available information technologies to coordinate and achieve successful investigative and enforcement activities at all levels, including international.*

---

These services are essential for meeting mission enforcement objectives within and across jurisdictional boundaries in a cost-effective manner. All Treasury bureaus whose missions involve enforcement activities will benefit from services that enable coordination with local, State, Federal, and international organizations.

### *KEY STRATEGIES*

- Establish a Treasury Intra/Intergovernment Enforcement Network Group to identify the required information, databases, and desired product of an integrated TCS Information Infrastructure for enforcement and investigative purposes. Take an incremental approach to consolidation and distribution of the information in accordance with developments within the separate organizations and in user requirements. Promote connection to the network first, then migrate to a common integrated information infrastructure, supported by network-based computing.
- Establish Intra/Intergovernment Enforcement Network Services as part of the TCS to facilitate the access to separate enforcement databases within the Treasury Department. Support connectivity to the networks of other enforcement organizations and those with extensive information resources, such as the DISN.
- Partition the TCS into subnetworks to accommodate the special needs of the enforcement community. The partition must be able to support multiple levels of security, user access control, and wireless communications.

## Wireless Communications Services

### VISION

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*TCS users will require interoperable, transparent, and secure Wireless Communications Services to pursue corporate objectives regardless of geographical location, mobility, natural disaster and emergency conditions, desired application, or preferred communications media.*

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Wireless Communications Services will facilitate remote access to data, voice, messaging, and extended LAN capabilities. Wireless capabilities are critical to personnel, even to their survival, during enforcement activities. Wireless also answers certain operational needs for telecommuting.

### KEY STRATEGIES

- Maintain the focused approach initiated in 1991 for Wireless/Radio Service and Support (WRSS) with the continued involvement of the Federal Law Enforcement Wireless Users Group (FLEWUG). Broaden the scope to include TCS protocol standards and network management to accommodate user-friendly access to secure data and interoperability with the law enforcement community at large. Standard commercial techniques for data access should be incorporated for message traffic, such as those being developed in the Project-25/Telecommunications Industry Association (TIA) groups for the next generation digital public safety radio.
- Establish standard security techniques for all Federal, State, and local radio systems. Close coordination between the Departmental security office, TCS, and Treasury organizations will be required.
- Identify wireless needs and applications based on sound business decisions. Bureaus must define their individual requirements for wireless interfaces with associated LANs and the TCS. In addition, introduction of the new wireless services must allow the use of both old and new technologies.

## Telecommuting Support Services

### VISION

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*Telecommuting Support Services will promote and support collaborative work efforts by linking TCS users at dispersed locations, thus increasing productivity, maintaining essential business services under exceptional circumstances, and encouraging employment of individuals covered under the Americans with Disabilities Act.*

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Telecommuting Support Services will offer a solution to environmental, socio-cultural, and business continuance issues that revolve around establishing alternative work sites. Studies indicate that significant cost and productivity advantages can be gained by allowing telecommuting as a work process option. For example, Treasury personnel could work from home or from a GSA satellite center close to home, rather than travel to a more distant Treasury facility.

### KEY STRATEGIES

- Establish a TCS Telecommuting Group consisting of bureau representatives to identify and justify pilot projects for TCS Telecommuting Services. This group should also establish criteria to evaluate alternative work facilities and Treasury employee requirements for access to automated information systems to perform their jobs on a “flex place” basis.
- Define a TCS telecommuting support infrastructure to determine requirements for automated information resources at alternative (i.e., non-Treasury) work sites. Include plans for leveraging ISDN technology (for increased bandwidth), LTSS and FTS2000 capabilities, and video conferencing.
- Implement TCS access control and other security procedures to support telecommuting and reduce vulnerability of data to improper remote access and use.

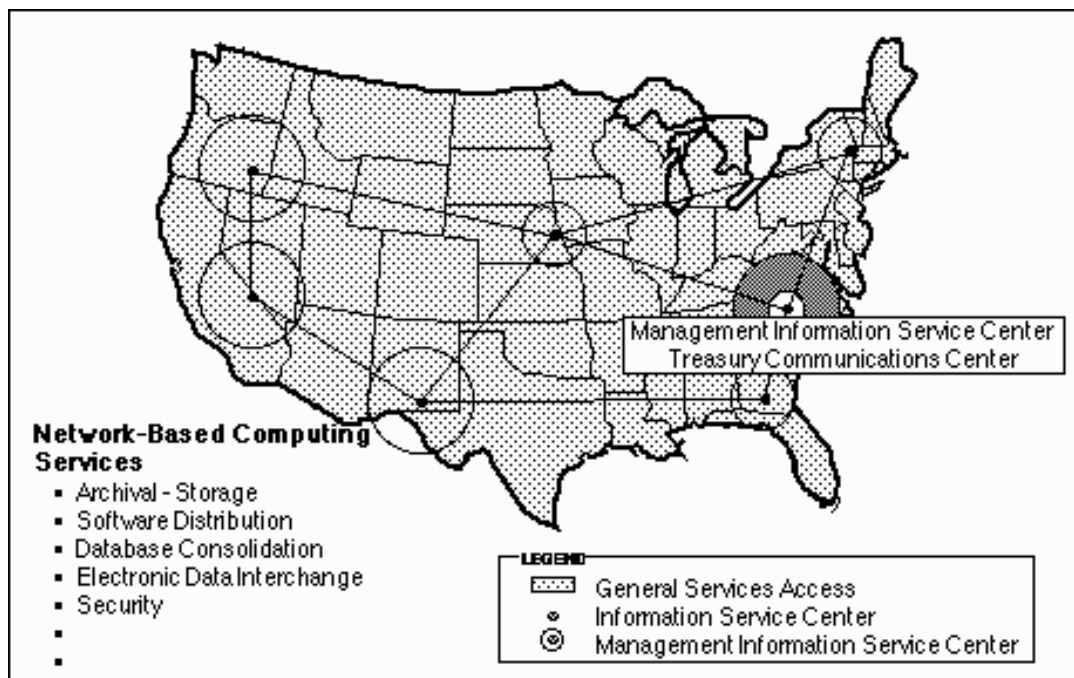
## Treasury Information Service Center(s) (TISCs)

The Core Team, while discussing the TCS corporate visions, recognized that the TCS represents a new paradigm for networks--the concept of using the network to operate a variety of network-based computing services. The TISC then becomes an operating facility providing a center of support for the access, control, and distribution of information services.

Benefits to be derived from this model include improved interfaces, enhanced security, increased productivity, uniform addressing and routing, quick problem resolution, and synchronization of databases.

An initial TISC will be located with the TCC in order to maximize service quality, minimize expenditures, and to integrate management and control of TCS network-based computing resources with security and network management. Initial network-based services could include training, consolidated electronic mailboxes, distribution of Government information to citizens, digital signature support, and EDI services.

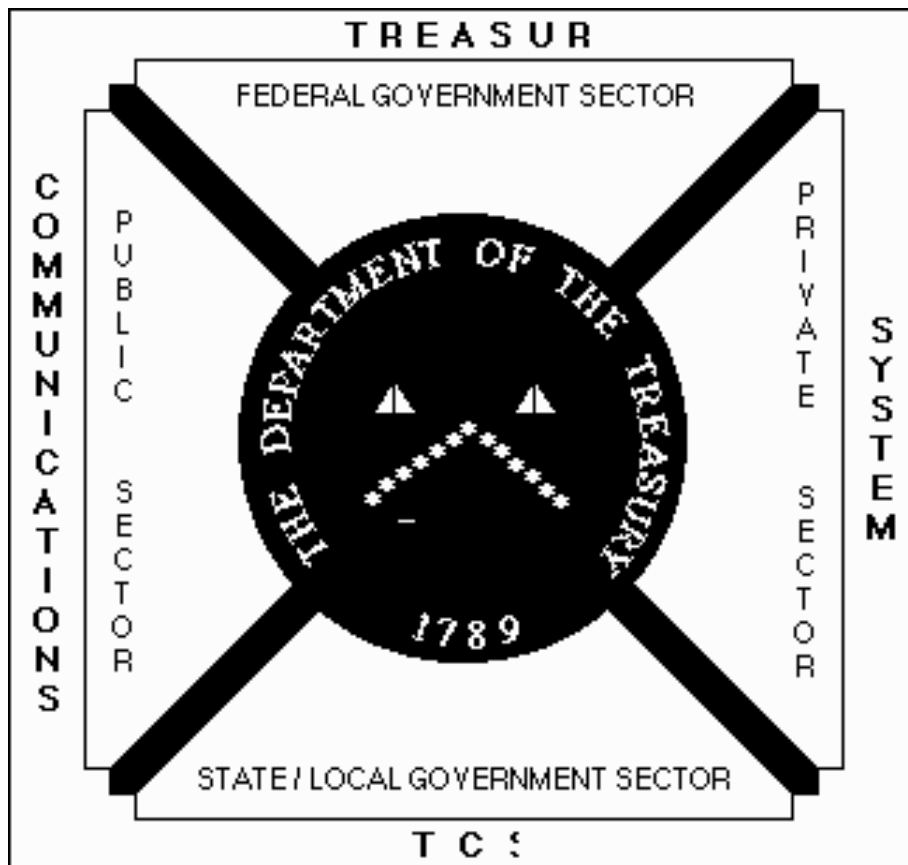
TCS Information Service Group(s) should be established as soon as possible, prior to TCS award, to help define the type, scope, and lead organization for selecting and specifying network-based services.



**Treasury Information Service Centers**



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**A STRATEGIC PLAN  
FOR THE  
TREASURY COMMUNICATIONS SYSTEM**

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## INTRODUCTION

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The Treasury Department telecommunications networks have been identified as major components of the Government Services Information Infrastructure, and key facilitators for the re-engineering of business processes. The Department's future Treasury Communications System (TCS) is not merely a modernization of the present Consolidated Data Network (CDN); TCS will provide Treasury with network-based computing services which are indispensable in the reengineering of its business processes.

The Treasury Department has previously identified functional requirements which will lead to initial contract award for TCS implementation. This Strategic Plan for the TCS will provide the TCS contractor and departmental program managers with the visions and strategic directions for leveraging and applying telecommunications and other related information technology resources.

The National Performance Review (NPR) has recommended that the Treasury Department play a leadership role in achieving the objectives of Electronic Government. The TCS will become a major component of the Government Services Information Infrastructure (GSII) and the strategic directions presented in this document have been developed in concert with the recommendations of the NPR and the GSII.

The recent exponential growth in the development of information technologies has generated what well may be the greatest management challenge ever faced by the Federal Government--the transition from the current compartmented environment to an open, integrated "Electronic Government." In this new environment, the pace will be fast, diversity will be the norm, development of new products will be overwhelming, and telecommunications advances will continue to blur regional, long distance, and international boundaries.

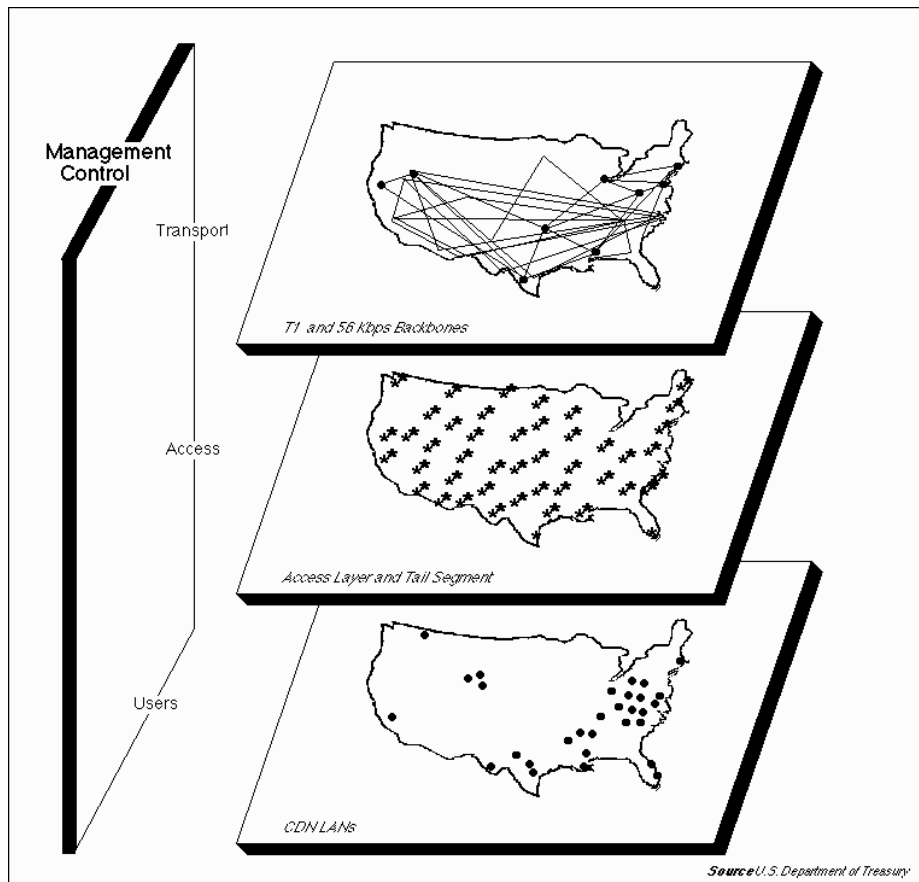
Because of the rapidly changing environment and in order to successfully transition CDN to the TCS and Electronic Government, it was of paramount importance that strategic directions, rather than short-lived technical elements be defined. Because this effort focused not upon the needs of a single agency, but rather upon Treasury-wide compatibilities, a consensus on which strategies to take was pursued.

The implementation of these strategies will assist Treasury in successfully meeting the demands of its numerous and diverse missions. The business objectives of the Treasury bureaus are constantly changing, and for several bureaus their tasks are increasing. The strategic application of new technologies will enable the TCS to better serve Treasury bureaus and improve their business processes and most important, the TCS will enable improved services to U.S. citizens.



## CDN AS THE FOUNDATION FOR THE TCS

The communications infrastructure created by the CDN is the foundation for the projected TCS. The Exhibit, “CDN Hierarchical Topology,” reflects the component configuration at each network layer, showing the interrelationship of access, user, and backbone layers.



**CDN Hierarchical Topology**

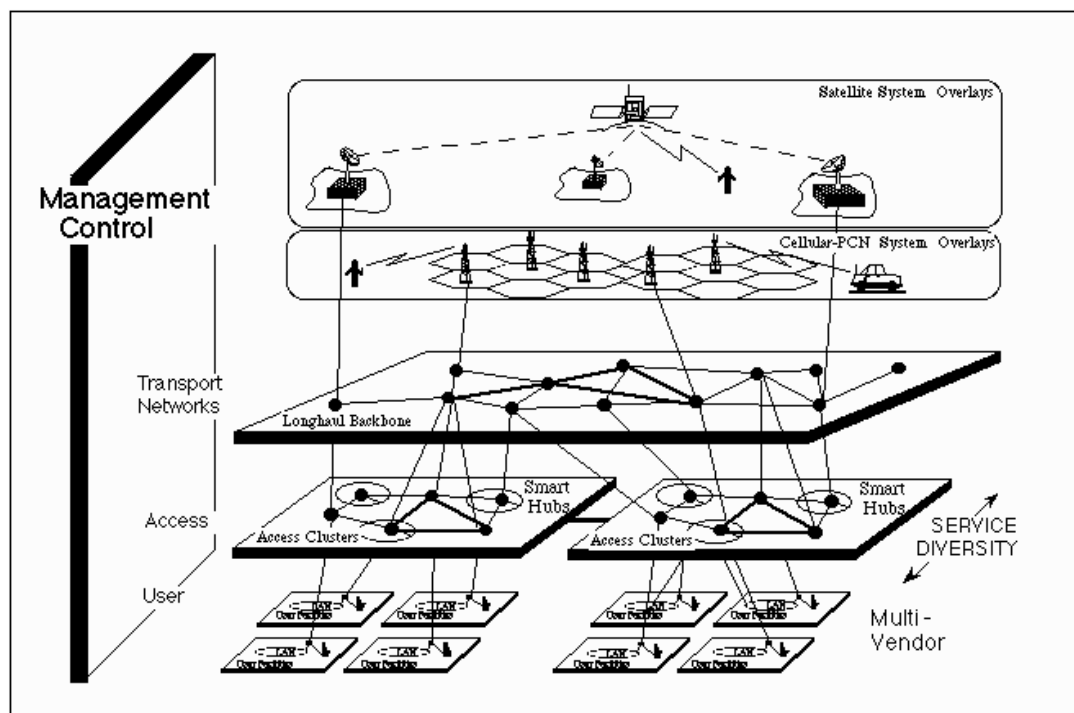
The functionality offered by this layered topology encompasses TCS communications capabilities with the exception of wireless connectivity as seen in the Exhibit, “TCS Integrated Network Infrastructure.” It is apparent that CDN fulfills many TCS communications requirements. As a consequence, TCS strategic planning can be directed toward integrating the applications and business components essential for creating an information service utility.

CDN is the largest secure, private Wide Area Network (WAN) in the U.S. civilian government. This flexible Treasury data communications utility has experienced major growth since its inception in 1987. The number of user locations serviced by CDN has increased by over 300 percent (from 1,264 active locations in 1987, to 4,092 active locations in 1993). The number

of site installations has increased by nearly 450 percent in the same time frame.

CDN is comprised of 175 nodes and approximately 2,000 network access devices. It stretches coast-to-coast in the continental United States. There are also network nodes in Alaska, Hawaii, Puerto Rico, Guam, the Virgin Islands, Bermuda, the Bahamas, and Canada.

CDN connectivity makes available technology that reflects the diverse business needs of users. TCS will build on this technological foundation to provide even greater core functionality and integration of multimedia communications. The TCS Request for Proposal (RFP) adhered to a functional specification, by identifying the traffic, interfaces and applications to be supported.



**TCS Integrated Network Infrastructure**

The results of the TCS Strategic Planning Project will help make the transition from the CDN to the TCS as smooth and seamless as possible, without interruption to services. The challenge for the new contract is to make the transition commensurate with the future telecommunications needs of the Department. All Departmental organizations must be involved in creating an internetworked service utility in which information services are centralized and information access is decentralized. There must exist a consensus within the Department of the Treasury that organizations will be equipped to fulfill operational requirements more cost effectively and responsively than previously. The consensus is that government can do more with less by taking advantage of networked information services and telecommunications technology.

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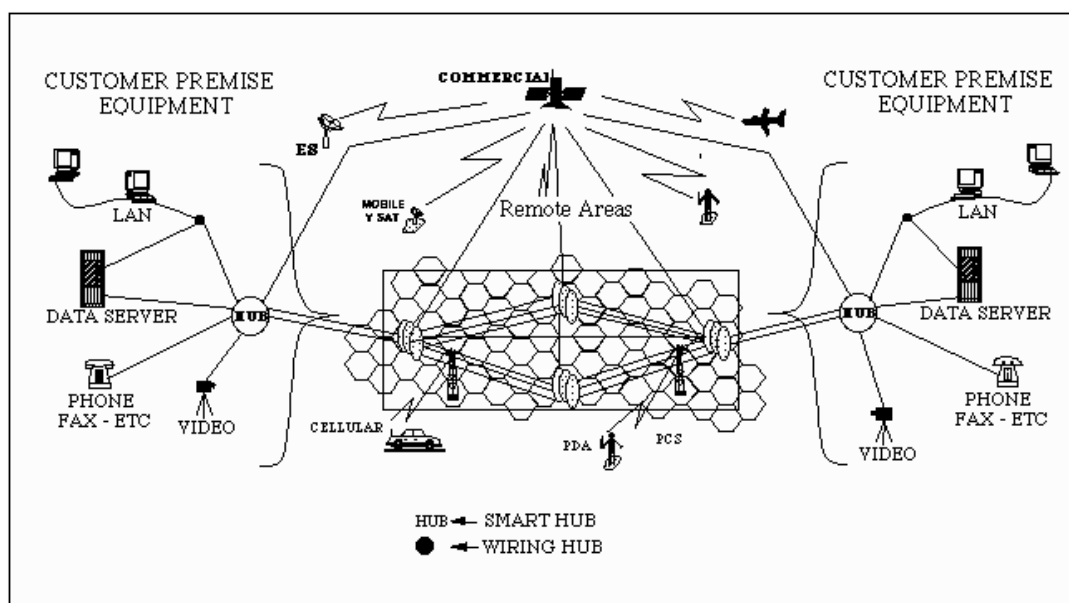


## TCS AND THE CHANGING ENVIRONMENT

The Treasury Communication System (TCS) will operate in a dynamic environment. This information services infrastructure must be flexible enough to respond to redefined requirements and allow Treasury organizations to avail themselves of new technology as it becomes available. TCS will continue the developments begun with the existing consolidated Data Network (CDN) for change management, improved services, and expanded service offerings. At the same time, staff must be reduced and the cost of hardware, software, and consumable resources must be cut. Both the private sector and Federal Government are making changes to the way they do business--changes made possible by advances in computing and networks.

The changes in computing include increasing demand for interoperable systems, expanded use of client/server applications, and a rapid growth in Electronic Commerce. Collaboration and gains in group productivity through workflow management are expanding in the areas of accounts processing and law enforcement. In addition, workers are placing more and more reliance on laptops and hand-held computers to perform their jobs.

Network changes include the use of wide area networks as backplanes or buses. The use of LAN smart hubs will drive the design of wide area networks. The Exhibit, "Network Media Integration," illustrates the manner in which a smart hub may be employed in a wide area network.



**Network Media Integration**

TCS must accommodate a variety of user access methods and all types of telecommunications media. Existing multi-vendor systems and service diversity present considerable challenges for effective management control and interoperability. A concept for a TCS network infrastructure suggested by the corporate visions, the Treasury Information Infrastructure, and emerging technologies has been shown in the Exhibit, "TCS Integrated Network Infrastructure," on page 4 of this document.

To achieve the current Administration's intention to stimulate Electronic Commerce, the National Performance Review (NPR) identified Agency telecommunications networks as major components of the Government Services Information Infrastructure and key enablers for reengineering business processes. The Treasury Information Infrastructure (TII), realized through TCS implementation, will provide the information and telecommunications services necessary to assist bureaus in achieving their Information

System Plans (ISPs). TCS will also benefit other Government agencies, creating the model or perhaps the actual capability, for the Government Services Information Infrastructure.

The Government Information Technology Services (GITS) Working Group recently issued its plans to fulfill NPR recommendations for using information technology. Many of the strategic directions identified in this document, the TCS Strategic Planning Project Report, detail specific actions necessary to satisfy items on the GITS agenda for high-profile interagency technology programs. The strategic directions also respond to NPR recommendations that the Treasury Department take a leadership role in:

- Establishing a National Law Enforcement/Public Safety Wireless Network.
- Providing the evolutionary migration path to fully integrated tax and entitlement reporting, processing, and payment (for example, by creating a virtual tax financial data agency for businesses and individuals in partnership with the States).
- Linking the various law enforcement agencies responsible for guarding against money laundering, the export of controlled high technology, and the importation of narcotics, hazardous waste, and other contraband.
- Developing an International Trade Data System.

The NPR recommendations point to Treasury as a natural leader within the Federal Government to develop and coordinate Federal Government policy on Electronic Data Interchange (EDI) and to represent the government in domestic and international organizations. TCS will be the essential innovative, flexible, modular telecommunications/information utility that will enable Treasury to fulfill this leadership role. TCS capabilities will affect the dynamics among all government organizations (Treasury, Federal, State, local, and international), in addition to the U.S. public (as individuals and as members of larger groups, such as commercial entities). Fortunately, much of the groundwork for the TCS has been done by the CDN.

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## **ADDRESSING CHANGE**

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Technology is changing rapidly, and the procurement process is often too ponderous to anticipate technical solutions to tomorrow's needs. Managing change is critical. In addition to planning for transition and creating consensus, another purpose of the TCS Strategic Planning Project was to develop strategies for managing change in a proactive manner. The multistage strategic planning process used for this project should continue on an iterative basis throughout the life of the TCS.

As a service-based utility, TCS will provide the potential resources to address the numerous changes that arise in meeting the corporate missions of each bureau. This does not mean that all organizations must make changes at the same time and to the same degree. The particular combination of resources or services used will vary according to each bureau's objectives, constituency, and business/work culture. Defining the TCS according to strategic directions allows maximum flexibility for solutions to bureau requirements. For example, the Bureau of Engraving and Printing (BEP) is highly production-oriented and needs tight coordination among its locations. BEP requirements for interfacing with other agencies are intermittent and do not have a big impact on the production environment. The U.S. Customs Service (USCS), on the other hand, depends on accurate information and constant interaction with outside organizations in conjunction with trade monitoring and enforcement activities. USCS is charged with maintaining an International Trade Database, which will be accessible through the TCS. Enforcement activities, such as those undertaken by USCS, the U.S. Secret Service (USSS), and the Bureau of Alcohol, Tobacco, and Firearms (ATF) rely on sharing information within Treasury and with other Government networks, such as the Defense Information Systems Network (DISN). Bureaus also have different imbedded technological bases that may allow more immediate use of some TCS features. Whether or not a Treasury organization has implemented Integrated Switched Data Network (ISDN) technology will determine the ease with which certain services, such as telecommuting, can be used. Bandwidth requirements vary according to whether a bureau must plan for steady or bursty traffic. The latter, of course, necessitates flexible bandwidth capacity.

Certain commonalities do exist across all bureaus, however. All bureaus are concerned with containing cost and optimizing productivity. TCS offers economies of scale for meeting cost goals, while providing timely and innovative technology to enable changes in work flow processes as appropriate. Providing the right resource tools can raise the productivity level of Treasury personnel. TCS can also offer training options that are tailored to meet an individual user's needs. The billing rate structure for TCS will be equitable and based on the set of information services used to meet bureau business needs. In addition, as telecommunications management and information services are integrated, TCS will provide adequate capability for the redundancy and backup essential to ensure continuance of each bureau's mission-critical

business.

The Corporate objectives for TCS include the following:

- Video Conferences
- Multi-media
- Internet Access
- E-mail (X.400, X.500)
- Internetting
- Interoperability
- Technology Infusion
- Standardization
- Wireless Access
- Protected Access
- Electronic Commerce
- International Access
- State Government Access
- Access to/from the Public
- Electronic Government
- Network Management
- Network Control
- Enforcement Networking
- Financial Networking
- Telecommuting

Government initiatives and information technology trends are driving changes in the way Government business is performed. The anticipated changes and demands for information services have already begun. The existing CDN is responding to some of these and is preparing for TCS development.

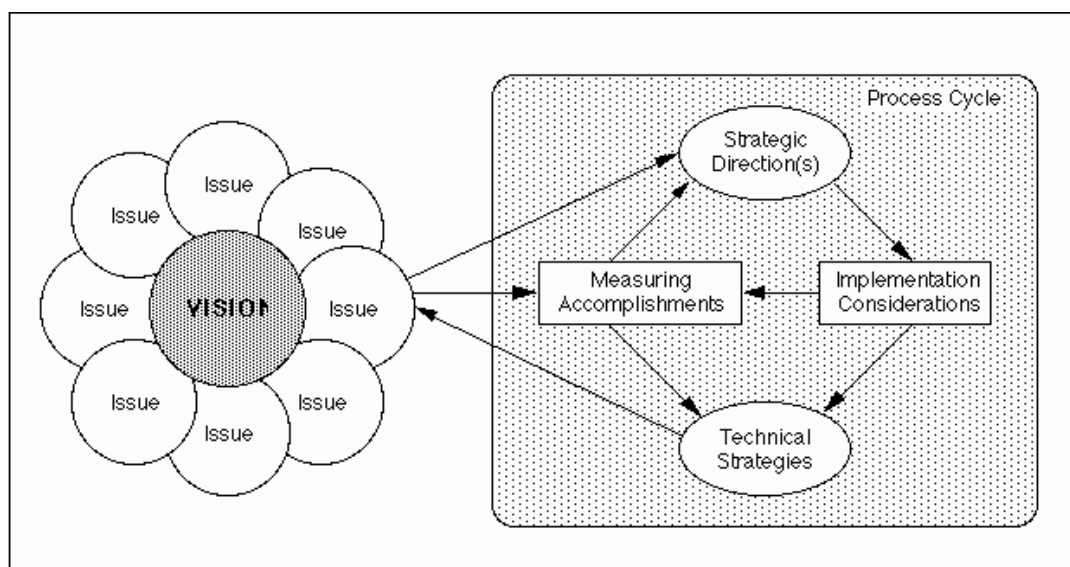
Some changes may be initiated due to externally defined needs, such as Presidential mandates for Government-wide electronic mail and directory services. Others, such as the desire for multimedia capabilities and telecommuting, were identified by internal Treasury users. Preparation for change is heralded by the convergence of technology (especially given price and performance developments), redefined enterprise success factors (such as alternative ways of filing for U.S. taxpayers), and fiscal realities (usually in the form of reduced budget allocations).

The set of communications/information services described in this plan respond to the visions of desired future capabilities that were articulated by representatives from Treasury bureaus. Various vision elements, such as interoperability, seamless connectivity, citizen privacy, and transparent access to remote databases, suggested the need for specific service offerings. They also indicated the value of the TCS enterprise network as the supporting structure for Treasury Information Service Centers (TISCs) for telecommunications services and network-based computer services. The TISC concept was derived from the corporate visions that embody Treasury Department consensus for managing change and the strategic directions developed through the Strategic Planning Process.

## THE PROCESS

The formal process that was adapted by T.J. McKeown and Associates, Ltd. for use in the TCS Strategic Planning Project was highly interactive and iterative, as can be seen in the Exhibit, “Strategic Planning Process Cycle.” Representatives from all Treasury bureaus contributed to the articulation of visions, or desired capabilities, in keeping with the desire to identify directions for the future implementation of TCS based on consensus. These representatives also participated in identifying issues that had to be addressed in order to achieve the visions and in developing key strategic directions. The visions, issues, and strategic directions formed the foundation for the TCS Strategic Plan.

### The Strategic Planning Core Team



**Strategic Planning Process Cycle**

The Treasury Department is a collection of bureaus with diverse responsibilities and thus represents a major challenge for creating consensus. Responsibilities revolve around: collection and payment of revenue, financial accounting, and enforcement. A Core Team of key personnel representing each of the 12 independent Treasury organizations (shown in the Exhibit, “Treasury Bureaus and Major Responsibilities”) was formed as the first step in establishing a baseline of expectations as a joint effort.

BUREAU	MAJOR RESPONSIBILITY	CORE TEAM REPRESENTATIVE (Primary)
BUREAU OF ALCOHOL, TOBACCO, AND FIREARMS	Revenue collection and enforcement of laws pertaining to alcohol, tobacco, and firearms	Ron Shuman (202) 927-7879
BUREAU OF ENGRAVING AND PRINTING	Printing currency, stamps, etc.	James Vitale (202) 874-3003
BUREAU OF PUBLIC DEBT	Management of the Federal debt	Margaret Shovira (202) 219-3307
OFFICE OF THE COMPTROLLER OF THE CURRENCY	Enforcement of Federal banking regulations	Jim Erdly (301) 499-6277
FINANCIAL MANAGEMENT SERVICE	Administration of Federal Government collections and payments	Wally Fung (202) 874-8862
FINANCIAL CRIMES ENFORCEMENT NETWORK (FINCEN)	Investigation of financial crime	Michele Rubenstein (202) 622-9805
INTERNAL REVENUE SERVICE	Collection of revenue and enforcement of associated laws	Ted Gonter (202) 927-7459
OFFICE OF THE SECRETARY OF THE TREASURY	Support to the Secretary of the Treasury	Peter Anderson (202) 622-1711
TREASURY INTEGRATED MANAGEMENT INFORMATION SYSTEM (TIMIS)	Oversight of personnel and payroll processing for U.S. Treasury	Mark Maring (202) 622-0353
U.S. CUSTOMS SERVICE	Collection of revenue and enforcement of international trade laws	Shari Reid (703) 440-6259
U.S. MINT	Production of US coins and safeguarding Treasury's stock of precious metals and other monetary assets	Gini Trotti (202) 634-8300
U.S. SECRET SERVICE	Enforcement of laws associated with protection of Government officials and U.S. monetary systems	Tom Wiesner (202) 435-5729

### Treasury Bureaus and Core Team Representatives

The Core Team was responsible for collecting data, developing questionnaires and interviews, and supporting activities that led to the shaping of visions and strategies. The Core Team identified the issues surrounding each vision that would affect its ultimate realization. These issues were addressed through the process cycle and rely on many different inputs for their resolution. The resolution of the issues then led to the development of strategic directions.

### Articulating the Visions

Through analysis of bureau business strategies and objectives, the Core Team compiled TCS corporate visions. These visions are stated without specific reference to time and resource investment. Each vision is relevant to future business and government operations and dependent on the TCS.

The Core Team also expanded the visions into vision foundations, defining the relevance of a



given vision for the Department and suggesting certain key strategies to guide implementation.

The essence of these vision foundations was then used to develop a high-level vision statement that was less constrained by the Treasury environment. The purpose of the vision statements was to indicate, in part, how TCS visions would fit into the broader context of a Government, or even a national, Information Infrastructure.

In formulating the vision statements, one of the original compound vision foundations, Electronic Commerce and Messaging Services, was divided into two distinct visions. By separating Electronic Commerce Services from Electronic Messaging Services, it was possible to give more complete treatment to each of these very significant technical/socio-cultural, business process developments.

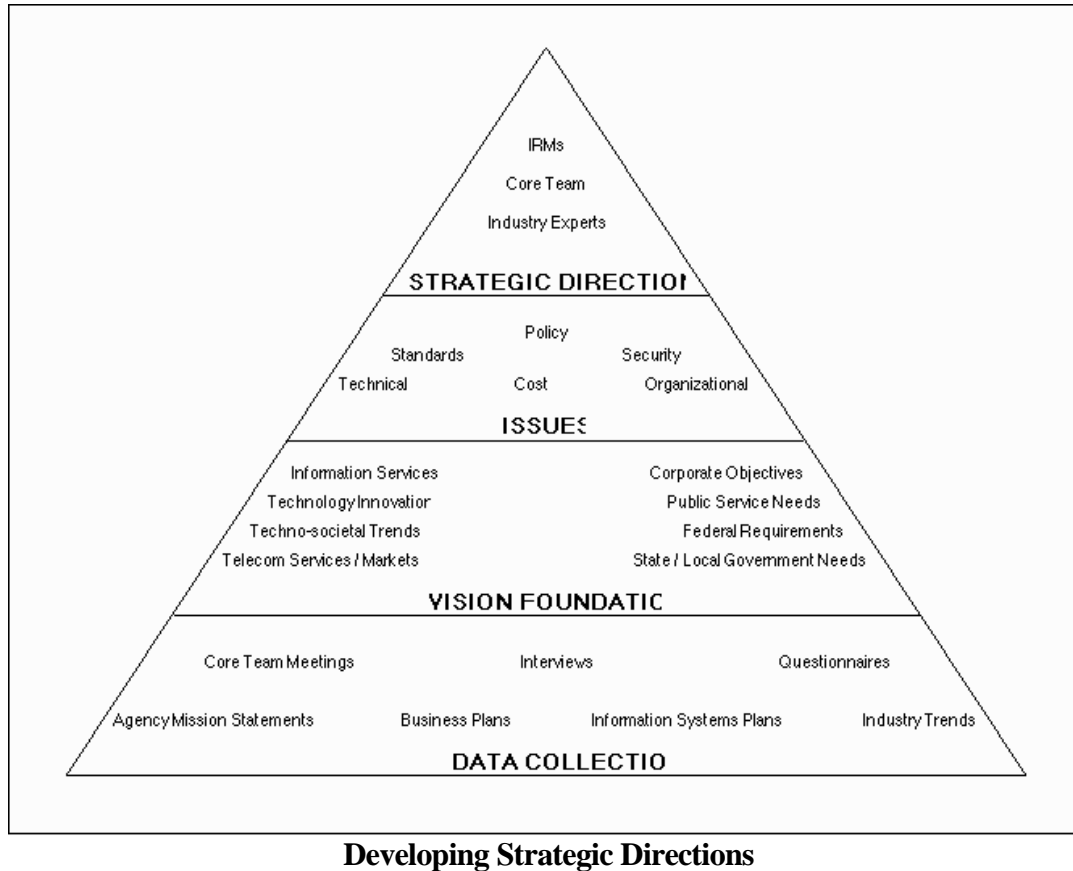
## **Identifying the Issues**

The Core Team identified issues that reflected the challenges to be addressed in achieving each vision. Issues have significance on a number of different dimensions, such as policy, technology, organization, operations, and culture. Information about issues was gathered through the data collection process and industry research. Treasury executives were interviewed to gain their insight into the visions and issues that strategically affect the TCS. Their high-level yet operational perspective was invaluable to the process, acting as a reality check about which services and functionalities were relevant to Treasury business objectives.

## **Developing Strategic Directions**

Strategic directions consist of actions and decisions necessary to realize the visions and resolve issues brought out in Core Team meetings. The model for developing strategic directions (see the Exhibit, "Developing Strategic Directions") allows for continuous input from Treasury organizations. The model underscores the need for constant reassessment when planning the use of a system that will change over time, as it responds to a dynamic business environment. A strategic direction may be composed of several supporting activities that require detailed, multi-stage implementation plans.

## Addressing Implementation Considerations



Implementation considerations were addressed within the context of the strategic directions. These considerations discuss some of the realistic constraints on action and serve to qualify expectations concerning the feasibility of various strategic directions and their likely consequences (in terms of time and resource requirements). The importance of establishing intradepartmental teams for coordinating effort is common to all visions. Some implementation considerations may suggest performance indicators for measuring accomplishments.

## Measuring Accomplishment

Each strategic direction, as related to the accomplishments of a vision, will require periodic performance measurement. The timing of implementation recognized the existing

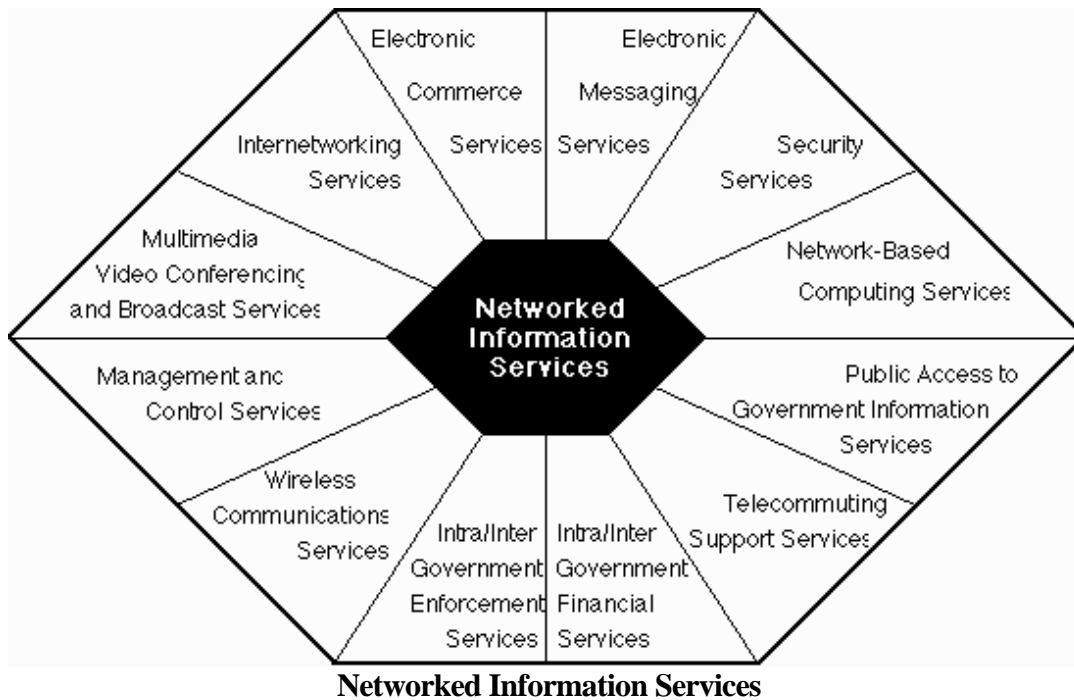
Consolidated Data Network (CDN) and its evolving capabilities, and the start-up of the TCS. Some strategies must wait for TCS, but others should begin earlier. For example, pilot projects being conducted using CDN will be monitored, documented, and the results transferred to the transition planning for TCS. Other strategies must wait for the capabilities available from the TCS infrastructure. In any event, periodic assessments by TCS management and user groups must be conducted to determine progress, problems, and value.

## **The Strategic Planning Process Cycle**

The TCS Strategic Planning Project, while based on a considerable amount of information and analysis, addresses a changing environment. Over time, visions will remain constant, although issues and strategic directions will not. The environment of TCS users will change both internally and externally. The goal of this strategic planning effort is to fix a blueprint for initial TCS implementation in space and time, while establishing processes for flexible response and reevaluation. Other benefits from strategic planning include reduction in staff resources (due to the use of consolidated planning, acquisition, and implementation of information technology); improvement in the timely delivery of services, both new and existing; and establishment of universal standards for management and technology.

The Strategic Planning Process will continue in response to constantly redefined issues and requirements to improve government and work flow patterns. Recognizing that issues and requirements will change over time is important. In order to attain the benefits gained from strategic planning for the TCS, a commitment must be made to establish a permanent strategic planning group. This group of dedicated professionals, with both management and technology skills, will continue an iterative process of focusing resources strategically--with the caveat that measuring the accomplishment of a vision is but a step in a continuing journey.

By following the Strategic Planning Process, the Core Team articulated 12 TCS corporate visions. The 12 visions describe Networked Information service offerings that lead to an overall TCS vision of a TII that will connect with the GSII and the NII. The discussion of the corporate visions that follows includes associated issues, strategic directions, implementation considerations, and measures of accomplishment. The Exhibit, "Networked Information Services," shows the 12 corporate visions.



## **THE CORPORATE VISIONS**

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## ELECTRONIC COMMERCE SERVICES

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### Vision

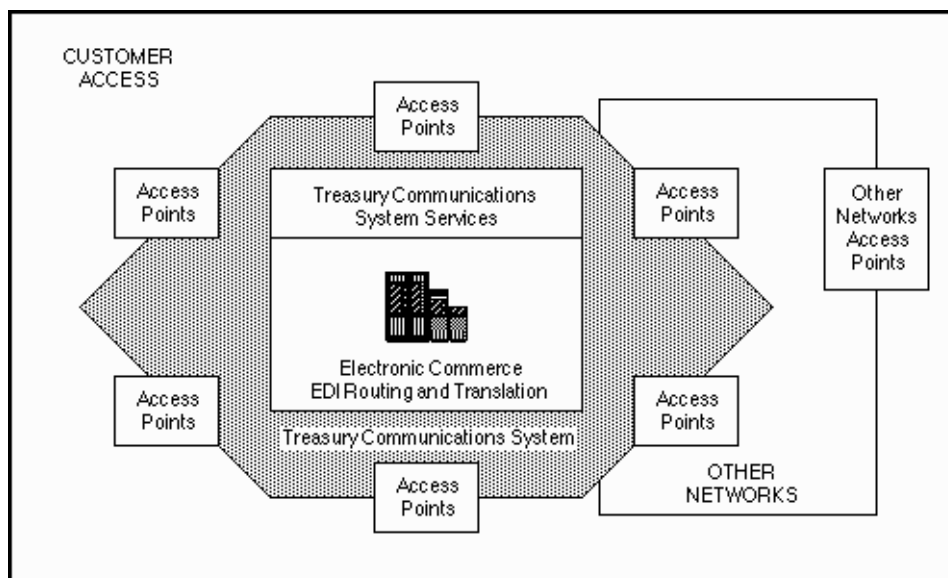
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*Electronic Commerce Services offer an integrated set of capabilities that TCS users may adapt to reengineer acquisition, payment, and tax-related business processes, thereby increasing productivity, reducing paperwork, and saving time in transacting business with Trading Partners.*

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### Vision Foundation

The Treasury Communications System will support a wide range of Electronic Commerce Services that will enable the transmission and translation of a myriad of government and industry standard data formats. The TCS will provide a method for private and public access to bulletin boards, databases, or E-mail, in support of government procurement processes and serve as a clearinghouse for a variety of agency-specific EDI requirements.



**Electronic Commerce Services**





## Overview

Electronic Commerce Services must accommodate the Trading Partners (TPs) of the U.S. Treasury Department and other Federal Government organizations. It must provide efficient and reliable electronic means for performing standard business activities, such as exchanging procurement information, processing invoices, paying and collecting funds. The service must handle high volume data transfer for use in distributed applications and must ensure timely routing and delivery of critical financial and accounting data.

TCS Electronic Commerce Services must accommodate American and international standards for EDI transmission and translation, and where necessary, tailor the service to the unique needs of Treasury TPs. An objective would be the migration of users toward common government standards consistent with industry as user systems evolve and the process matures.

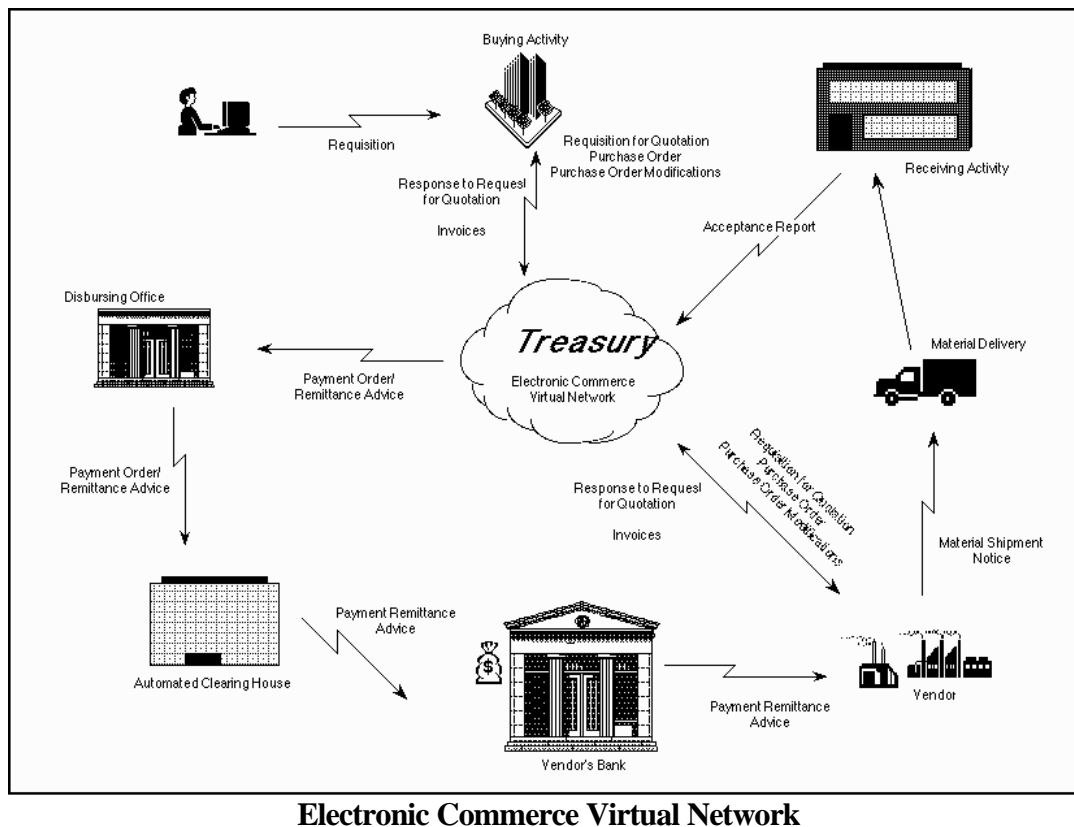
U.S. Customs Service, the Internal Revenue Service, Bureau of Alcohol, Tobacco & Firearms, Financial Management Service, and other Treasury bureaus are responsible for enhancing and expanding electronic payment and collection systems to reduce the cost and time required for processing. At present, for example, the U.S. Customs Service uses EDI as it exchanges data with over 1,700 trade users and 7,000 on-line users while processing import and export transactions of the international trade community. The use of EDI technology streamlines business operations and will support creation of an International Trade Database, as recommended by the NPR. The IRS has an initiative to support all tax-related messaging interchanges from TPs such as corporations, financial/banking institutions, State and Federal agencies and international entities. The TCS will play an important role in the internetting of networks (public, private, and international) to support business among TPs and take advantage of the efficiencies afforded by Electronic Commerce.

## Issues

### ELECTRONIC COMMERCE VIRTUAL NETWORK

The Department of the Treasury should be positioned to serve a leadership role in the realization of the Electronic Commerce Virtual Network. The Electronic Commerce Acquisition Team (ECAT), an interagency task force, has described an architecture that would provide the Federal Government and its TPs the capability to participate in Electronic Commerce at various levels. At the core of the ECAT architecture is the concept of a Virtual Network. The Virtual Network is the mechanism that Federal agencies will use to transport and receive data from commercial networks that serve Federal Government TPs by providing connectivity to the FTS2000 network, global Internet, other government agency networks, VANs, public carriers, and user communications distribution points. Treasury's Consolidated Data Network (CDN) provides much of the above connectivity now. The TCS, once implemented, could

serve as the core telecommunications infrastructure for the Federal Government, as shown in the Exhibit, "Electronic Commerce Virtual Network."



#### EDI ACQUISITION

The Department of Treasury, in cooperation with the General Services Administration (GSA), must remain an active participant in formulating EDI acquisition plans and policies throughout TCS development.

#### EDI INTEGRATION WITH E-MAIL

Integrating EDI with a variety of E-mail products is the key to realizing long-term business benefits associated with Electronic Commerce. Treasury must follow national and international standards for Electronic Commerce transaction sets. The primary standards for EDI in North America are the American National Standards Institute X12 Standards (or simply ANSI X12). A compatible set of standards is used in Europe and much of the rest of the world. These are the United Nations Standards for EDI for Administration, Commerce, and Trade (UN/EDIFACT).

## EDI STANDARDS

EDI standards fall into three categories: transaction sets (or messages), the data dictionary, and the electronic envelope. The vast majority of EDI standards are concerned with transaction sets (such as purchase orders, invoices, requests for quotes, etc.). The data dictionary defines the data elements that comprise the transactions, and the electronic envelope contains addressing and other administrative information that immediately precedes and follows messages in EDI transmissions. The envelope controls the routing.

## X.500 DIRECTORY SERVICES

The X.500 Directory Services Standard should be implemented; this will simplify addressing and routing for Electronic Commerce activities.

## Strategic Directions

Leverage U.S. Customs Service experience with EDI and monitor its projected increases in workload due to trade laws and national/international economic policies.

Coordinate CDN/TCS Electronic Commerce development with requirements defined under Tax Systems Modernization and other initiatives.

Take a leadership role in Electronic Commerce development within government especially by formulating EDI acquisition plans and policies in cooperation with the General Services Administration (GSA). The TCS must be prepared to support any Treasury Electronic Commerce procurement and other initiatives, including participation on the Electronic Commerce Acquisition Team (ECAT).

Participate on ECAT and take advantage of the National Institute of Standards and Technology (NIST) testbed being established for government agencies to evaluate components of EDI that pertain to TCS Electronic Commerce services.

Build Electronic Commerce capabilities within the TCS that will enable Treasury and other designated government agencies to reengineer business processes.

Configure the existing CDN to serve a selected set of EDI requirements for Treasury.

Migrate the EDI services provided by the CDN to the TCS and evolve the TCS capabilities to be able to serve as the Federal Government's Electronic Commerce Virtual Network.

Promote a global Electronic Commerce outlook and support international trade awareness.

Encourage the use of recognized standards-based Electronic Commerce transaction sets (such as X12 or EDIFACT) rather than proprietary formats for TCS EDI translation services.

Develop Electronic Commerce services to incorporate the advantages of universal mailbox services and integrated enterprise-wide messaging. The Exhibit in the vision section on Electronic Messaging Services entitled, "X.400 Universal Mailbox," illustrates how an X.400 universal mailbox might be used for integrating internal or external electronic messaging and EDI.

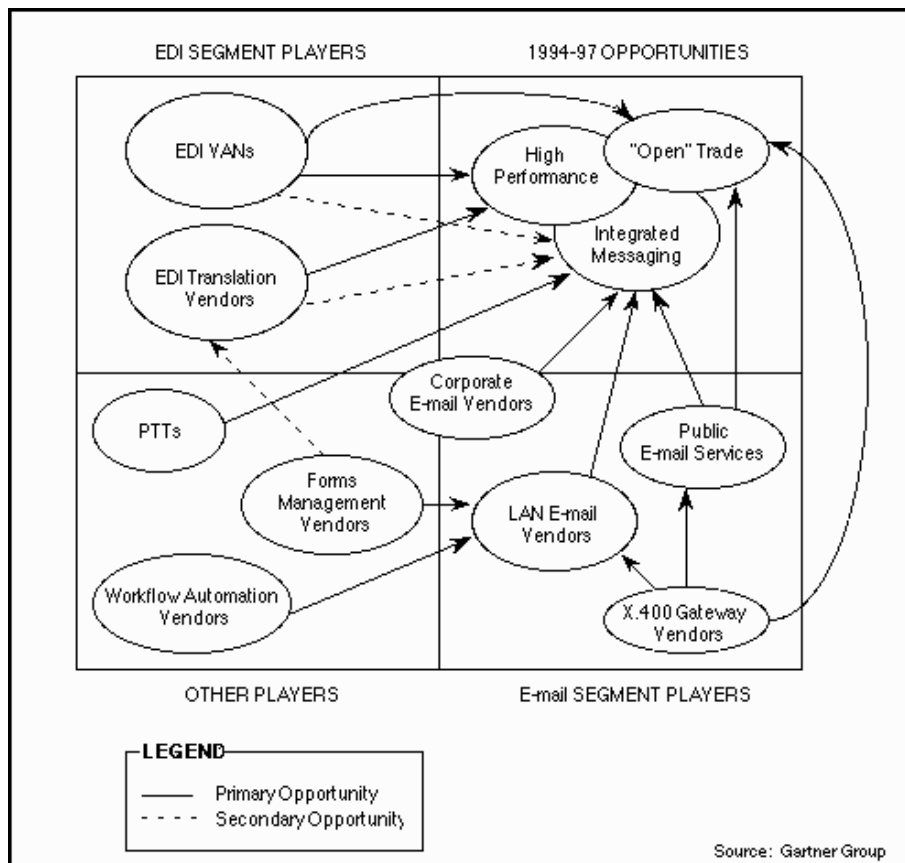
Implement the X.500 Directory Services Standard to simplify addressing and routing for Electronic Commerce activities.

Adopt and leverage EDI and E-mail technologies as they converge into high performance and integrated messaging products.

### **Implementation Considerations**

CDN/TCS Electronic Commerce Services must support storing and routing EDI data using X.400 messaging technology and X.500 Directory Services, and adopting the X.435 standard when available.

User demand is driving vendors to develop integrated messaging products that will allow open trade for users as well as transmission of multiple information types, as shown in the Exhibit, "EDI and E-mail Players Aim at New IES Opportunities."



### EDI and E-mail Players Aim at New Integrated Enterprise System Opportunities

#### Measuring Accomplishment

The growth of Electronic Commerce throughout the world, using international standards, has been exponential over the past two years. Within the U.S. and the U.S. Government, Electronic Commerce is also developing rapidly. In particular, the U.S. Customs Service has been a catalyst, requiring that all shippers and receivers conform to EDI standards since the 1980s. IRS and FMS are also reengineering business processes to make use of EDI technology.

The TCS will be forced to keep pace with both national and international use of Electronic Commerce. A baseline measurement should be taken of CDN progress with respect to Electronic Commerce by the beginning of FY96. As the TCS develops, advances can be monitored and accomplishments measured as pilot programs are implemented, forms are registered by ANSI X12, and Electronic Benefits Transfer programs are established.

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## ELECTRONIC MESSAGING SERVICES

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### Vision

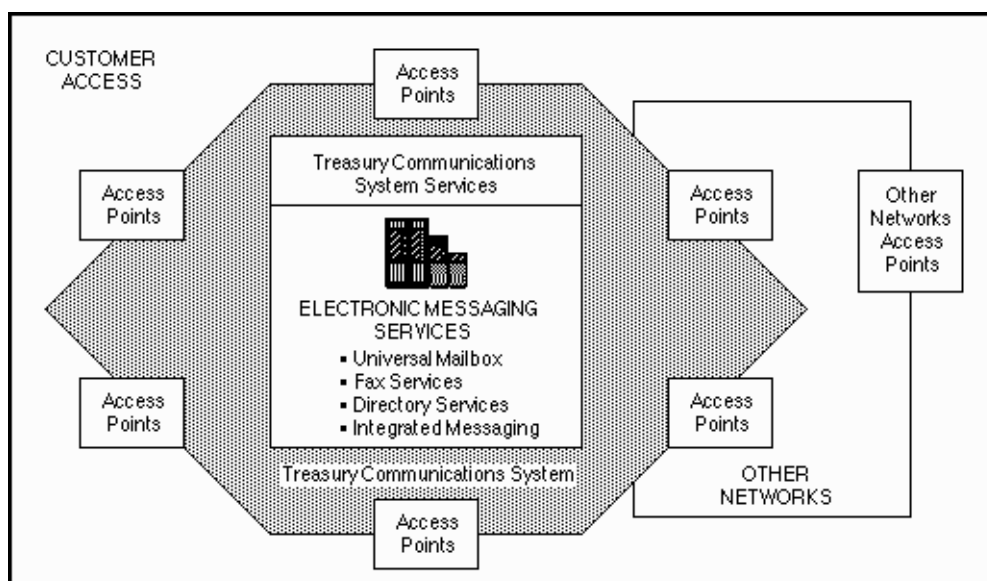
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*Electronic Messaging Services will build the essential standards-based infrastructure to link all TCS users, creating communications media that exemplify the Electronic Government.*

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### Vision Foundation

The TCS will support a wide range of Electronic Messaging Services that will improve intra/intergovernment business communications, increase worker productivity and efficiency, and afford the general public the opportunity for better access to government information and citizen services. The TCS will support the need for messaging directory services and offer advanced services, such as integrated messaging (E-mail, voice mail, facsimile, and images), using open system standards.

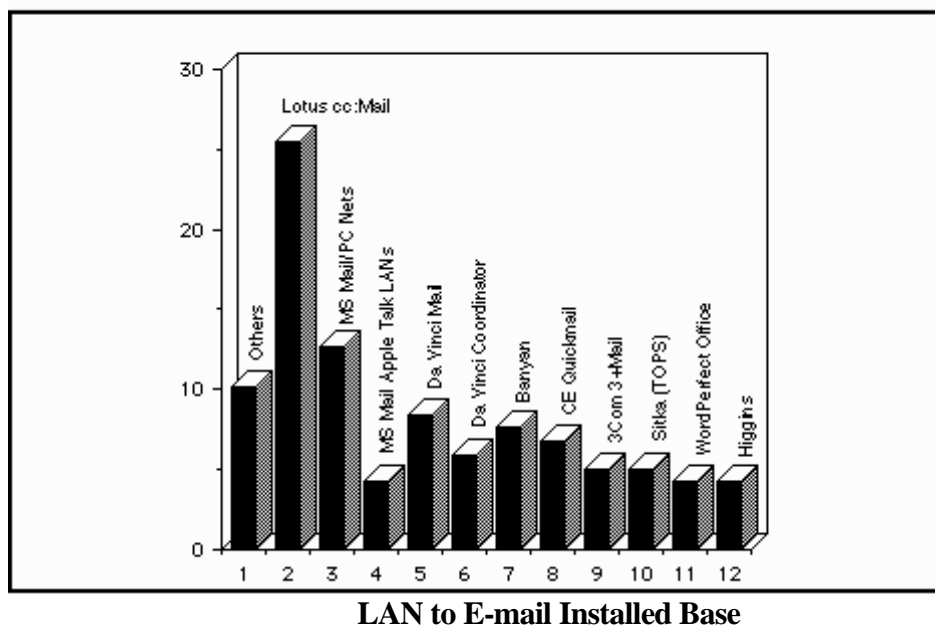


**Electronic Messaging Services**

## Overview

The emergence of the technology known as electronic messaging has accelerated the already rapid rate of change in the way the government internally and externally exchanges information. It is safe to estimate that within the next five years, four out of five government employees will have access to some form of intergovernmental electronic messaging technology. It is the TCS vision to provide government employees the ability to exchange information electronically and smoothly by developing operational capabilities and procedures that support all future Electronic Government applications. Instructional programs and material, even correspondence courses, could be disseminated with the help of TCS Electronic Messaging Services.

Electronic Messaging is industry's most rapidly growing application today. Growth is concentrated in the LAN messaging market segment and in global Internet messaging. Also, a number of Value Added Network (VAN) providers sell mailbox services, message relay services, and facilities managed virtual private messaging network solutions. They charge according to service category, connect time, computer usage, and message storage. The Exhibit, "LAN to E-mail Installed Base," highlights the LAN E-mail products in the market today. These systems are in the midst of rapid technology upgrade as messaging technology converges with groupware and group productivity tools such as, electronic forms, mail-enabled applications, content-based dissemination, and calendaring/scheduling that have become standard fare in product offerings. However, the integration of vendor-specific messaging solutions by bureaus poses a challenge for achieving effective Department-wide messaging.



The TCS, as a department-wide messaging backbone, will help meet this challenge by providing a manageable, standards-based architecture to which workgroups and offices can easily “plug-in.” The TCS messaging backbone will provide a high performance ubiquitous messaging service for bureau employees and serve as an enabler for technology migration and upgrade.

## **Issues**

### **TCS DIRECTORY SERVICES**

To reduce redundancy of effort, Department-wide naming and addressing conventions must be established. Such conventions will facilitate the updating and synchronizing of directory databases across Treasury. By adhering to the X.500 standard, these directories will also conform to the prescribed Federal standard for a Government-wide hierarchy of directories. It must be determined how detailed directory breakdowns will be and how the responsibilities for management will be assigned. The TCS systems architecture for all the directory services must allow for ease of management and maintenance responsibilities, access and retrieval, and integration of directories when specified.

### **MESSAGING MANAGEMENT**

At a minimum, TCS will assume responsibility for Electronic Messaging Services across the Department. A decision must be made as to whether the TCS should support the operation and management of messaging servers (or post offices) as well. Finally, a decision should be made as to whether or not the TCS service should provide mailboxes for roaming users, or users without LAN mailboxes.

Depending upon the scope of the service provided, a decision must be made as to how management responsibilities will be coordinated between the TCS and user groups. For example, if the TCS manages the Electronic Messaging backbone, but user groups manage servers/post offices, then issues such as directory integration, product release certification procedures, help desk, interconnection guidelines, and other operational issues need to be worked out. Intergovernment, international, and private sector mailbox management will also require special attention.

### **DATA STORAGE AND RETRIEVAL AND MEDIA CONVERSION SERVICES**

Several storage and retrieval systems are anticipated in order to accommodate different organizations and legacy systems. In addition, services to accommodate conversion for



various document formats need to be defined.

#### GATEWAYS

The TCS should offer multifunctional gateways to a small number of “agency-standard” mail systems.

#### STANDARDS

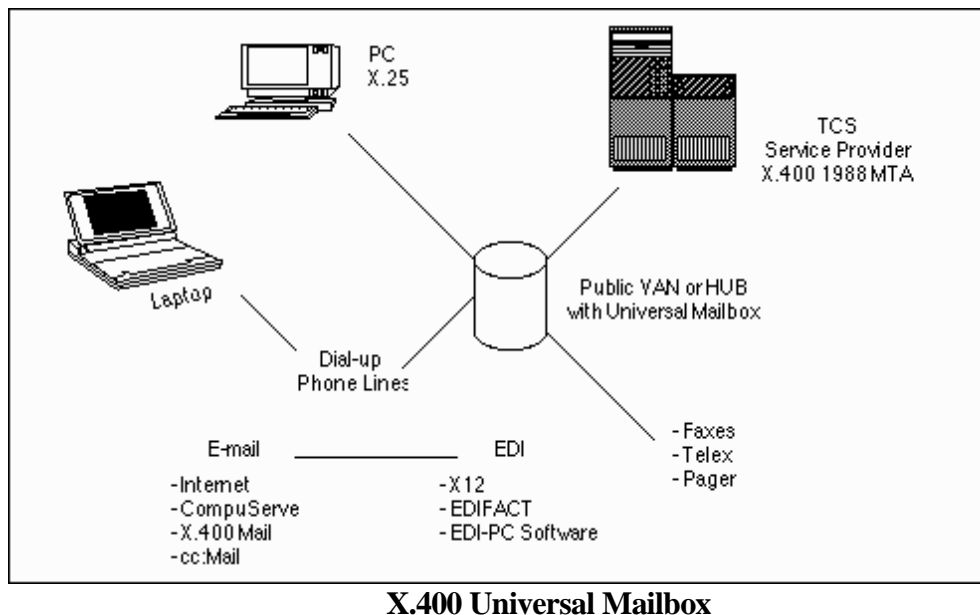
Federal Government standards must be complied with in all cases where appropriate. Interoperability demands the definition of common standards among affinity groups and wherever else it can be accomplished without undue operational or fiscal hardship. The 1988 X.400 and Internet Mail (SMTP/MIME) standards are widely used, although these standards will continue evolving over time.

#### INTERNET ACCESS

TCS should support user access to the Internet. Internet is the network of networks, linking more than 1,800 domestic and 600 foreign networks at education, research, and scientific organizations around the world and is growing exponentially. According to the Gartner Group, 25 percent of usage is now for commercial purposes, and the remainder is limited to “acceptable use,” or research-oriented use. The Internet offers a rich research base, communicating between governments and educational agencies for general, low cost data. However, there are problems facing both users and service providers who interconnect to the Internet. Some of the major problems are: security, junk mail (or unwanted solicitations), incompatibility with X.400, and limited functionality (binary E-mail and other applications must use gateways, many of which are proprietary).

#### X.400 UNIVERSAL MAILBOX

An X.400 universal mailbox is important to facilitate the electronic exchange of information between TPs. Forward-thinking electronic messaging proponents recognize that integrating EDI with a variety of E-mail products and capabilities is the key to realizing long-term business benefits. The Exhibit, “X.400 Universal Mailbox,” illustrates how an X.400 universal mailbox might be used for internal or external integrated electronic messaging and EDI.



### Strategic Directions

Establish messaging standards for the TCS that are consistent with U.S. and international commercial practices. The recommended standards today include the most widely accepted X.500, 1988 X.400, and Internet Mail.

Enable a protected and highly secure access to Internet, World-wide Web, and bulletin board/kiosk information resources for the benefit of the Treasury Department, its personnel and customers. Leverage the connectivity offered by FTS2000 and LTSS to increase bandwidth availability and reduce cost.

Establish TCS mailbox management services as an extended service for selected user groups. TCS mailbox management services should also gateway with bureau-specific messaging systems.

Establish E-mail conversion services that will convert facsimile and other media to E-mail and allow communication between different E-mail systems.

Integrate the communications transport capabilities offered through FTS2000 and Local Telecommunications Support and Services (LTSS). TCS should support user access to the Internet, but not rely on the Internet for bandwidth. Also, TCS should not rely on the Internet for mainline government exchange of critical information.

Gateway the TCS to the global Internet, but build appropriate security firewalls to isolate

internal networks and support authorized access as necessary and consistent with Treasury policy.

Leverage Internet services and information for the benefit of the Treasury Department and its customers.

Establish a TCS management structure to maintain awareness of appropriate standards bodies and consolidate the results (benefits/impacts) for Treasury. The results of this effort should be available on an electronic bulletin board for TCS access.

TCS management must be represented in the U.S. Electronic Messaging Association (EMA). The entire Treasury Department must be kept apprised of current implementations and standards activities. EMA is solving messaging problems through committee efforts. Some of the issues currently being faced are: interoperability of message attachments between different messaging systems, new addressing schemes, and solutions to interoperability problems, including X.400 and Internet.

Conduct industry research and leverage existing solutions to identify appropriate alternatives for creating global directory support services.

### **Implementation Considerations**

The TCS will benefit from previous CDN Internet pilots with regard to operational utility and information services available. The implementation of TCS Electronic Messaging Services must include the transition of messaging services from the CDN, and integrate new capabilities as they evolve. The development of electronic messaging within each bureau must adhere to TCS standards and X.500 directory implementation plans to realize an interoperable Treasury-wide electronic messaging capability.

The implementation of any messaging services on the TCS must be accomplished in a cost-effective manner as compared to commercially available services. In some cases, commercial services may be more efficient and the TCS could provide access to available commercial service providers.

### **Measuring Accomplishment**

The Treasury Department must assess the magnitude of need and benefits derived from CDN initiatives prior to implementation or expansion of messaging services on the TCS. Periodic reviews must be implemented for TCS Electronic Messaging Services to determine progress and assess resolution of problems. Performance metrics, as established by Treasury-wide participants, need to be developed. The establishment of a special user group that will measure

the accomplishments of all electronic messaging services would be beneficial.

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## INTERNETWORKING SERVICES

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### Vision

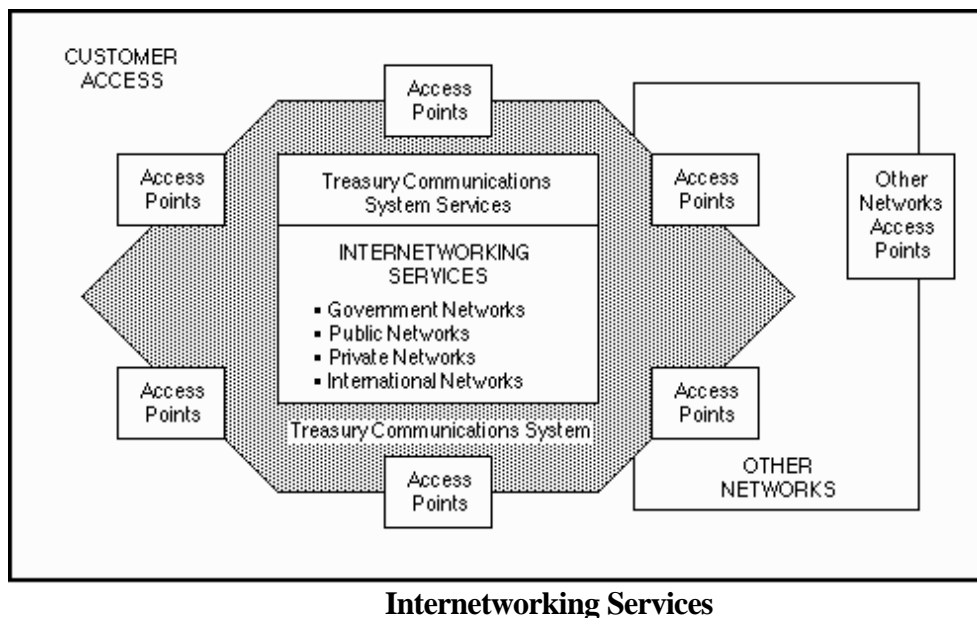
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*Through Internetworking Services, TCS users will freely interoperate with multiprotocol networks and applications, taking full advantage of information resources available through the National and Government Services Information Infrastructures.*

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### Vision Foundation

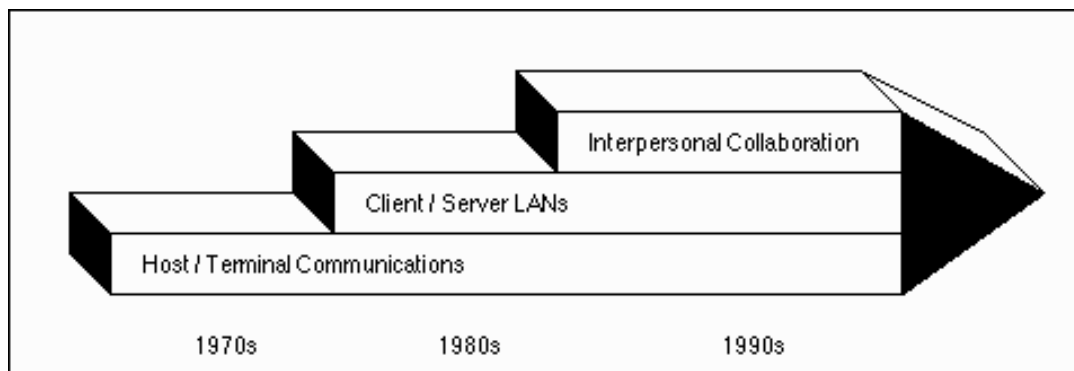
Internetworking Services provided by the TCS will offer a full range of network interfacing and interoperable applications within and between Treasury and other Federal and non-Federal networks. Internetworking Services provided by the TCS will become an integral part of the Government Services Information Infrastructure (GSI).



## Overview

Internetworking services will offer a full range of integrated connectivity within and outside Treasury, including other Federal agencies, other governments (State and local), the private sector, and international communities. These services will establish network level interfaces, gateways, and security features for designated applications to support information system requirements. The internetworking capabilities of the TCS will be integrated with, and become a significant operational component of, the Government Services Information Infrastructure (GSII) which will further enhance the ability of Treasury users to collaborate and share databases within government communities. The TCS, as an internetworking component of the GII, will evolve with the National Information Infrastructure (NII) to increase private sector access to government information and services.

The Exhibit, "Trends in Interoperability: 1970s to 1990," illustrates recent industry trends that will be reflected in the TCS; however, the pace of change will depend upon fiscal levels and the anticipated return on resource investments. The TCS must support legacy systems as well as new generation technology as it migrates to the future. This does not mean the TCS will lag behind industry initiatives, but unlike some commercial businesses, it must accommodate old technology that remains embedded before fully adopting the latest innovations. The TCS will also lead industry in many areas of networking because of the numerous, diverse government and commercial networks it must join to fulfill fiscal, regulatory, and enforcement responsibilities in support of the U.S. public. The Exhibit on the following page, "Sample of Treasury Internetworking Requirements," shows some of the interfaces that will be supported by the TCS.



**Trends in Interoperability: 1970s to 1990**

ORGANIZATION	INTERFACE (GOVERNMENT SECTOR)	INTERFACE (NONGOVERNMENT SECTOR)
BUREAU OF ALCOHOL, TOBACCO AND FIREARMS (ATF)	<ul style="list-style-type: none"> <li>Federal, State, Local Government</li> </ul>	<ul style="list-style-type: none"> <li>Producers and Distributors of Alcohol, Tobacco, and Firearms</li> </ul>
BUREAU OF ENGRAVING AND PRINTING (BEP)	<ul style="list-style-type: none"> <li>Federal, Governments, Postal</li> <li>Federal Reserve</li> </ul>	<ul style="list-style-type: none"> <li>Federal Reserve</li> </ul>
BUREAU OF PUBLIC DEBT (BPD)	<ul style="list-style-type: none"> <li>Federal Reserve Communications System (FEDNET)</li> <li>FMS</li> <li>Treasury (Office of the Fiscal Assistant Secretary)</li> </ul>	<ul style="list-style-type: none"> <li>Public Information Boards</li> </ul>
OFFICE OF THE COMPTROLLER OF THE CURRENCY (OCC)	<ul style="list-style-type: none"> <li>All Government Banking Systems</li> </ul>	<ul style="list-style-type: none"> <li>Federal Commercial Banks</li> <li>National and International Banking Associations</li> </ul>
FINANCIAL MANAGEMENT SYSTEM (FMS)	<ul style="list-style-type: none"> <li>Federal Program Agencies</li> <li>Office of Management and Budget (OBM)</li> <li>Department of Labor</li> <li>FEDNET</li> <li>BPD</li> <li>MINT</li> </ul>	<ul style="list-style-type: none"> <li>Federal Reserve Banks</li> <li>Financial Institutions</li> <li>Railroad and Retirement Board</li> </ul>
FINANCIAL CRIMES ENFORCEMENT NETWORK (FINCEN)	<ul style="list-style-type: none"> <li>Federal, State, Local Enforcement Agencies</li> <li>State Department</li> <li>Department of Defense</li> </ul>	<ul style="list-style-type: none"> <li>Global Financial Community</li> <li>Commercial VANs</li> </ul>
INTERNAL REVENUE SERVICE (IRS)	<ul style="list-style-type: none"> <li>Social Security Administration (SSA)</li> <li>State and Local Governments</li> </ul>	<ul style="list-style-type: none"> <li>Commercial VANs</li> <li>Private Corporations</li> <li>Citizens</li> <li>Foreign Governments</li> </ul>
OFFICE OF THE SECRETARY OF THE TREASURY	<ul style="list-style-type: none"> <li>All Internal Treasury Organizations</li> <li>Interdepartmental Organizations</li> </ul>	<ul style="list-style-type: none"> <li>Commercial VANs</li> <li>Telecommunications Service Providers</li> </ul>
U.S. CUSTOMS SERVICE (USCS)	<ul style="list-style-type: none"> <li>Immigration and Naturalization Service (INS)</li> <li>Other Federal, State, and Local Governments</li> <li>FMS</li> <li>Treasury Enforcement Communications System (TECS)</li> <li>Interagency Border Inspection System (IBIS)</li> </ul>	<ul style="list-style-type: none"> <li>Foreign Governments</li> <li>Trade Community</li> </ul>
U.S. MINT	<ul style="list-style-type: none"> <li>FMS</li> <li>General Services Administration (GSA)</li> </ul>	<ul style="list-style-type: none"> <li>Federal Reserve</li> </ul>
U.S. SECRET SERVICE (USSS)	<ul style="list-style-type: none"> <li>National Crime Information Center (NCIC)</li> <li>Federal Bureau of Investigation</li> </ul>	<ul style="list-style-type: none"> <li>Transportation Industry</li> <li>Commercial VANs</li> </ul>
TIMIS	<ul style="list-style-type: none"> <li>Department of Agriculture</li> <li>Veteran Affairs</li> <li>National Science Foundation</li> <li>State and Local Governments</li> <li>Treasury Bureaus</li> </ul>	<ul style="list-style-type: none"> <li>Commercial Banks</li> </ul>

### Sample of Treasury Internetworking Requirements



In consideration of Treasury's business needs, TCS must provide users with the capability to interoperate with numerous information systems. For example, the IRS Tax Systems Modernization program initiatives demand rapid and accurate exchange of electronic data, including the sharing of files and databases among computer processing centers, customer service centers, and other user communities. For example, this data must be transferred "on-demand" in order to satisfy on-line user telephone conversations and transactions. The Interagency Border Inspections System (IBIS) and the Automated Commercial System (ACS) of the U.S. Customs Service depend upon interfacing with other hosts and networks in the public and private sectors. IBIS must interface with the Immigration and Naturalization Service (INS) and foreign, State, and local governments. ACS and the new Automated Commercial Export System (ACE) interoperate with over 1,700 trade users and 7,000 on-line users as they process the transactions of the international trade community and support the enforcement of import and export laws.

Financial Management Services (FMS) must link with the Federal Reserve Communications System (FEDNET). Along with the Bureau of Public Debt and the U.S. Mint, FMS must interoperate with Federal Reserve Banks. The System 90 Enterprise Network (FMSNET) will benefit from TCS internetworking capabilities for sharing and reporting financial data. Also, the Financial Crimes Enforcement Network (FINCEN) must be supported by the TCS to enable access to the global financial community, as well as to enforcement agencies (Federal, State, and local), and commercial Value Added Networks (VANs), to meet its critical mission. Internetworking with the Defense Information Systems Network (DISN) will also be critical for enforcement as well as for national security.

The U.S. Secret Service and the Bureau of Alcohol, Tobacco, and Firearms, in addition to other Treasury enforcement agencies (e.g., USCS, IRS, FINCEN), require mobile computing capabilities with integrated wireless data access via TCS internetworking to a variety of databases. Treasury Integrated Management Information System (TIMIS) must interoperate with several Federal agencies (e.g., the U.S. Department of Agriculture, Veteran Affairs, and the National Science Foundation) and State and local governments.

Finally, the TCS must become a Department-wide, and to some extent a government-wide LAN Internet, sharing a common protocol environment to the maximum degree possible. Agencies must have the means to readily access and share information with all levels of Government and private sector organizations.

## **Issues**

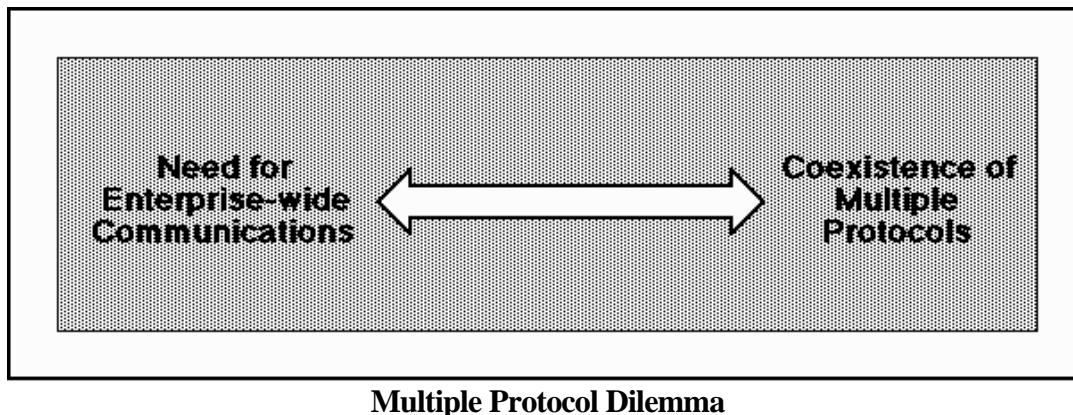
### **MULTIPLE PROTOCOL DILEMMA**

Limiting the number of protocols used for the TCS is difficult, but essential for

network performance, component simplicity, and increased interoperability. In an ideal world, a single widely accepted protocol that is common throughout the information technology industry would solve many problems. In the real world, however, protocols proliferate and complicate enterprise-wide communications (see the Exhibit, "Multiple Protocol Dilemma").

#### ADDRESSING AND NAMING CONVENTIONS

Network addressing must be developed for the systems that will be interconnected. Responsibility and control for addressing must be clearly defined at each network level--local, campus, and wide-area. Address Resolution Protocol (ARP) and Reverse Address Resolution Protocol (RARP) will require special addressing and router configurations for private and common network architectures.



#### LAN-TO-LAN INTEROPERABILITY

Direct LAN-to-LAN interoperable connections between disparate LANs can be very expensive when special software and gateway products are required. Treasury-wide requirements exist for access between disparate LANs and for users to reach mainframe and distributed databases maintained by other Treasury or non-Treasury organizations. The TCS, acting as a corporate internet, must provide interoperable services, which will significantly reduce the costs of establishing direct connections.

#### CENTRALIZED SOFTWARE DISTRIBUTION

A TCS solution is required that will allow the centralized distribution of software to and from PCs (or workstations) and configuration management and control procedures. In addition, records about this software that detail attributes, versions,

control of versions, licensing, financial information, and responsibility for maintenance must be kept centrally.

#### CLOSING THE GAP BETWEEN APPLICATIONS AND TELECOMMUNICATIONS

There is a need to close the gap between applications and telecommunications services. Interoperability, as a transparent service of the TCS, will give users freer access to disparate LANs and databases and allow economies of scale.

#### NETWORK MANAGEMENT

Network management across system boundaries presents obstacles for problem determination and resolution. Fault isolation, traffic flow control, and configuration management tasks do not readily cross network or protocol boundaries. In addition, the TCS must be capable of integrating voice, data, and video to accommodate multimedia applications.

#### BANDWIDTH ALLOCATION

Costs for bandwidth, even under FTS2000, are high. Techniques to use bandwidth more effectively (such as data compression techniques) may introduce problems for interoperability. Bandwidth requirements must be managed centrally; however, since software distribution, database replication, and image transfer are WAN application categories, bandwidth will be a premium resource.

#### INTERNET ACCESS

The TCS, as a full service network, should offer protected gateway Internet services and capitalize on the Internet's transmission options, data sources, and global availability.

### **Strategic Directions**

Take an incremental approach to change, in accordance with the availability of reliable internetworking technologies, and based on the definition of user requirements. Promote connection to the network first, then migrate groups to an interoperable suite of products.

Set clear and unequivocal directions on standards so that information system changes are made consistent with the standard. Avoid the temptation to grant waivers to the standard and to force preemptive conversion to the standard. In addition, freedom at OSI model levels three and four should be limited.

Define critical networks outside Treasury to which connectivity is required. Such networks would include the Defense Information Systems Network (DISN) and the Simplified Tax and Wage Reporting System (STAWRS).

Standardize on the use of TCP/IP for all new systems.

Establish a uniform Department-wide addressing scheme consistent with Electronic Government objectives and the X.500 standard.

Implement multi-protocol routing mechanisms to create the fabric of a communications network, while supporting the parallel operation of new and legacy systems. The TCS must be able to connect via routers and switching hubs for maximum distributed computing. High speed, intelligent switching levels offer users the capability to access several LANs, servers, and databases.

Create the appearance of a single enterprise communications and information utility from a combination of new and legacy systems supported by multiple transmission technologies which are “glued” together by multiprotocol routers.

Use a combination of commercial VANs and common carriers to meet TCS service requirements as appropriate.

### **Implementation Considerations**

The quest for interoperability should not overshadow specific operational/production requirements.

The level of detail required in the billing rate structure for TCS use should not introduce excessive administrative cost nor decrease performance efficiency.

Tunneling and host emulation are two critical approaches for accommodating protocols on legacy systems.

Certain operations-oriented legacy LANs may not need to make the transition to TCP/IP in the near term; implementation of TCP/IP should, however, begin when funding permits.

### **Measuring Accomplishment**

The level and the extent of internetworking services to be provided by the TCS will require a high degree of coordination among Treasury organizations. Coordination is essential between

functional groups, that is, information resources and telecommunications management personnel. Although universal interoperability is not required, given the dissimilar missions of some bureaus, certain natural communities of interest exist among various applications and would benefit from internetworking. Interoperability and internetworking services enhance organizational effectiveness through synergy. The CDN has already begun to provide internetworking services. CDN accomplishments in this area should be evaluated prior to implementing additional internetworking capabilities for the TCS. High level integration and continued review of internetworking capabilities are required.

The advantages associated with interoperability are relevant to Treasury interaction with other government organizations as well. Affinity groups should determine the interoperability objectives and meaningful performance indicators for their joint activities. Measuring accomplishments of internetworking and interoperability services, therefore, will be a cooperative effort.

The Federal Internetworking Requirements Panel (FIRP) was established by the National Institute of Standards and Technology (NIST) to reassess network requirements for open system networks and to recommend policy on the government's use of networking standards. Treasury should monitor FIRP recommendations and adapt appropriate recommendations to support mission objectives.

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## SECURITY SERVICES

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### Vision

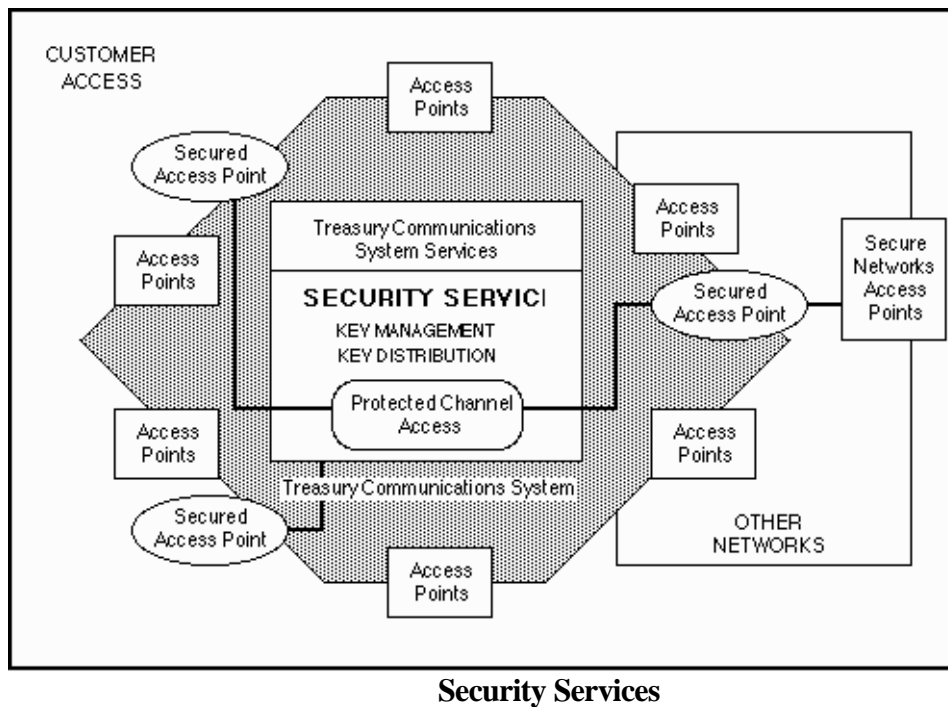
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*The integrity, confidentiality, and availability of the TCS network and those information resources, products, and activities encompassed within the TCS will be ensured by Security Services, with full accountability to the level of the individual user and/or transaction.*

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### Vision Foundation

Security Services as they pertain to the protection of the information carried by the network, as well as the network itself, must be consistent with Treasury policy, the range of user needs, associated risks, laws, and capabilities. The TCS, as defined by network points of access, must safeguard against unauthorized access, and maintain integrity and protection of the switching, data storage, and transmission components of the network. This protection must provide accountability and protection of the information transported where necessary and be an integral part of network management and control.



## Overview

The U.S. Department of the Treasury has multi-tiered security needs to protect the exchange of classified information, the access to sensitive information, and the integrity of information. Treasury must also protect the privacy needs of U.S. citizens. Migrating to a distributed information system introduces risks and vulnerabilities more easily controlled in a physically contained mainframe-based network. Core and extended Security Services will support user access through network extensions, wireless, or other networks consistent with the security needs. Extended security services may include, but not be limited to, data encryption, password management, routing to ensure end-to-end integrity, and predictable transport between the sending and receiving systems using the network services.

TCS Core Security Services are directed at the protection of the information in transport between TCS access points. The protection required will vary depending upon the system, the information, and the application. The variety of protection levels required does not promote a single solution but requires the integration of techniques involving operational procedures, physical protection, and automated mechanisms which imply a system-level approach tailored to the bureau or application need.

TCS Security Services should be central to a number of applications. Digital signatures and certification of signatures are services that can be supported by the TCS. This support can be an integral part of TCS Network Management and Control Services. Educational programs to

refresh employee awareness of security procedures can be delivered electronically at pre-determined intervals as an associated service with Multimedia/Video/Broadcasting Services.

Generation, distribution, and control of authorized access schemes and cryptographic keys can be supported from a central TCS facility. This centralized service affords the users, who maintain management control, the ability to share physical space, personnel, and other resources.

## **Issues**

### **TREASURY SECURITY POLICY**

Treasury security policy is bureau-specific and does not address the future availability of centralized security services through the TCS. TCS network security must support multiple security architectures.

### **ORGANIZATIONAL RESPONSIBILITY**

Organizational responsibilities must be clear when security services are distributed between the TCS and end users to support risk analysis and protect against vulnerability.

### **COMPETITIVE PRICING**

TCS Security Services should be priced competitively and detail the appropriate allocation of recurring and nonrecurring expenditures to users.

### **NETWORK PERFORMANCE**

Security Services must not significantly degrade response time, network reliability, or restoration of network services.

### **MANAGEMENT**

Access to sensitive materials by personnel in TCS management must be limited and strictly controlled to avoid disclosure or modification by unauthorized TCS personnel.

### **USER DOMAINS**

Mechanisms for security protection must be implemented in a manner which supports central TCS management (economy of scale), yet satisfies particular user needs to



control security and information domains.

#### VULNERABILITY OF DISTRIBUTED SYSTEMS

Distributed information systems share a variety of communications, computers, software, personnel, and facilities, adding a degree of potential vulnerability in the absence of centralized management of resources.

#### PUBLIC ACCESS TO RECORDS

The confidentiality of information and privacy of U.S. citizens must be protected from improper access or disclosure.

### **Strategic Directions**

Establish a Treasury organization responsible for the oversight of TCS Security Services to ensure that implementation and application of security utilities are consistent with the current policy and related directives. This should include training, risk assessments, and approval or certification of security service for the organization requesting support.

Establish an operational testbed in concert with the National Institute of Standards and Technology (NIST) for evolving security standards useful to the Treasury Department such as digital signatures. The operational testbed would give the Treasury Department a good understanding of the developing security standards and support NIST efforts. IRS is now working with NIST on creating an external access utility that would offer an automated security protection for those filing tax information electronically. The applicability of the IRS approach for TCS should be evaluated.

Evaluate public access programs such as TeleFile to identify measures that could be taken to protect data from improper access or the use of any information that, although not appropriate for general dissemination, is nonetheless transmitted electronically.

Establish an internally consistent, global naming scheme for TCS users that conforms to the X.500 standard. Include information necessary for the generation of attribute certificates.

Formulate policies for Security Services associated with the TCS. Such policies would give user organizations the ability to acquire electronic key distribution, firewall implementations, and special auditing as services of the network. The policy should emphasize the centralization of security maintenance, training, and other overhead processes of a secure transport system. User organizations should maintain the control and management of critical information necessary to maintain the security of their particular application or network domain. Common

applications should share common methods of protection.

Segregate information intended for public or group membership access from data that requires protection because of its sensitivity.

Implement appropriate software- and hardware-based cryptographic mechanisms for password and data protection for use in mobile computer devices. Mechanisms should also support digital signatures and be available for all information transported over the TCS.

### **Implementation Considerations**

Protecting information requires an understanding of the information to be protected, the system application in which the information system is employed, and the user group. With the growth of distributed processing and the advantages the TCS provides Treasury organizations, there is much to be gained in identifying the common elements of protection required. Prior to the implementation of TCS Security Services, it will be necessary to identify the common security protection desired and develop consistent security policies. The policies associated with the TCS should specify an access node-to-access node security, end user-to-end user security support, and source encryption.

### **Measuring Accomplishment**

Measuring the accomplishment of TCS Security Services depends on the security architecture implemented. Risk reduction must be consistent with good business decisions; the cost of implementing additional protection must be consistent with the risk anticipated. Measuring the accomplishments of TCS Security Services is a function of TCS management and participating organizations. Periodic measurements predicated on TCS progress should begin as soon as is reasonable.

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## NETWORK MANAGEMENT AND CONTROL SERVICES

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### Vision

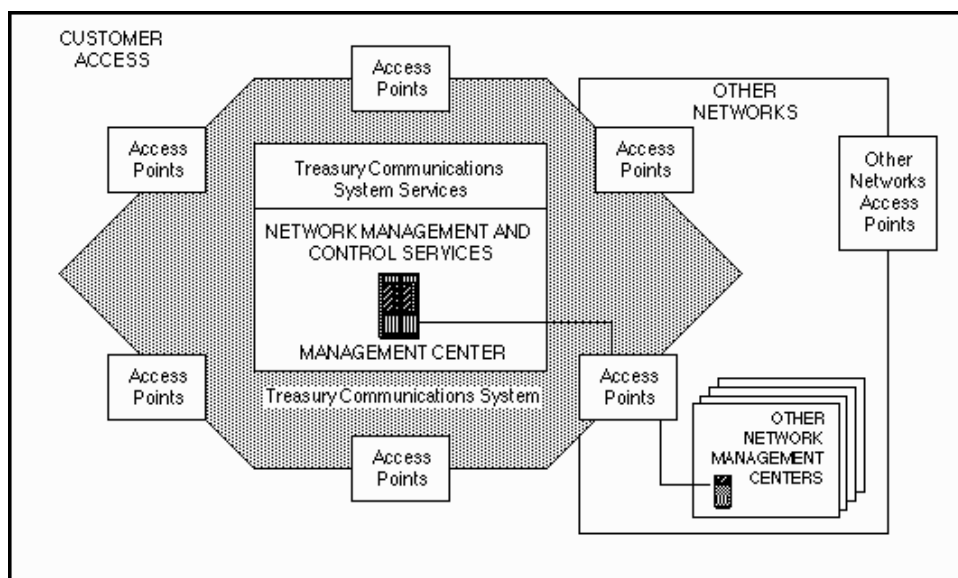
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*TCS users will benefit from proactive problem isolation, diagnostics, and dynamic reconfiguration as Network Management and Control Services allow a composite view of the entire system, with segmented domain administration and service privileges as required by individual agencies.*

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### Vision Foundation

Network Management and Control Services provided by the Treasury Communications System must allow a unified view of the entire network domain and the ability to invoke management utilities for configuration control, problem isolation, network performance status, and analytical tools to support every level of the network. The network management system must accommodate network management needs associated with other dedicated and virtual networks.



**Network Management and Control Services**

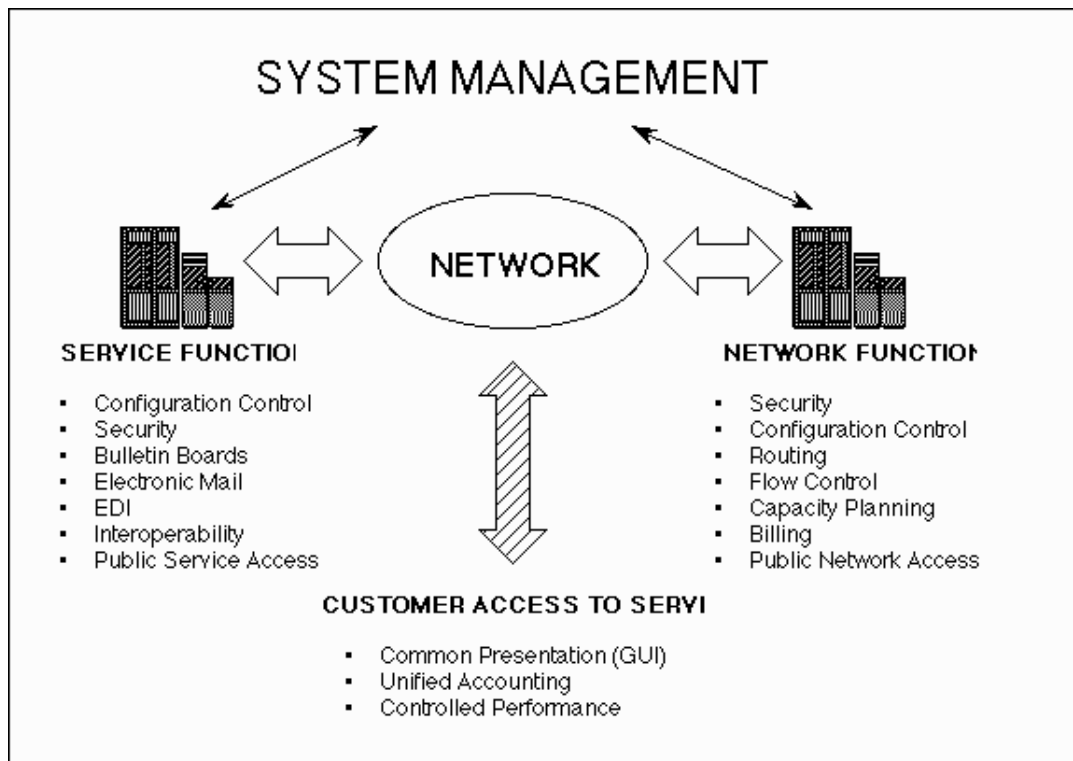
## **Overview**

Decentralization and distributed processing add complexity to network management and control services. Maintaining centralized control while managing a nationwide network of dissimilar components represents a real challenge to designers, suppliers, implementors, and users alike. Centralized TCS Network Management and Control Services would allow a single view of the entire network domain and the ability to invoke utilities and analytical tools that support every level of the network domain. These services also include planning, organizing, designing, optimizing, installing, monitoring, billing, and accounting.

Legacy systems, proprietary software, and organizational boundaries tend to limit effective automated network management and control. Management procedures must ensure that responsibility for actions crossing organizational and system boundaries are assigned. Statistical data for network management and control must be integrated by TCS, and its collection automated, to reduce duplication of effort by independent management systems. Problem isolation is often thwarted when it becomes necessary to involve another management system for problem isolation and resolution. TCS Network Management and Control Services must support TCS query of all the devices under its domain and subsequent services in configuration, statistics, fault isolation, and performance tuning. TCS should provide service from a centralized perspective and minimize the impact on system availability and performance.

Treasury bureaus need predictable network performance as an integral part of day-to-day operations. Enforcement and financial networks require extraordinary reliability and control to ensure support of operations where time, accuracy, and security are critical. Specific or extended TCS Network Management and Control Services must be available for domain control, since mission affinity groups may require unique services tailored to their specific applications.

Management of the Treasury Information Service Center(s) in association with the Treasury Communications Center is potentially a major savings for the Treasury Department. The network management system will have a responsibility similar to the operating system of a computer today. The Exhibit, "Network and Services Management," illustrates the service and network functions to be offered.



### Network and Services Management

The evolution of current network management systems to an information system management function will be controlled by technology, funding, competitive forces, and life cycles of existing network and computer systems. The objective of the TCS network

management approach will be to facilitate migration to a uniform and integrated service-based utility.

## **Issues**

### CONTROLLED ACCESS

Access to any TCS management and control information functions related to the network (or external networks) must be protected.

### SERVICE RESPONSIVENESS

Moves, additions, and changes should be done in a timely manner. Network provisioning must reflect the responsiveness of a direct user/provider interface, without the burden of a bureaucratic management layer that increases cost and extends the time to acquire services. Charges for the services must be competitive.

### MANAGING THE MANAGERS

The scope of TCS Network Management and Control Services will expand as the TCS develops. If Treasury Information Service Centers are established at strategic locations throughout the network, a meta-level of overall system service management is necessary for central coordination.

### ORGANIZATIONAL RESPONSIBILITIES AND POLICY

Network Management and Control Services beyond TCS access points need specific definition and clarification of responsibilities as they pertain to Network-based Computing Services (for example, EDI translation).

## **Strategic Directions**

Adopt a hierarchical multidomain network management system based on an Open Management Platform Architecture. This architecture could allow connection to independent local management consoles and the use of SNMP to all TCS devices and carrier management services. Migrate the entire enterprise to a single network management platform standard over time.

Require the use of SNMP for all TCS devices and interfaces to carrier management services.

Build the TCS network management system incrementally, adding functionalities and relevant

software to the system as they become available. Choose management products that represent the “best of breed,” rather than opting for a single source provider of all management products.

The best management system will be a heterogeneous mix of software products guided by a unified standards process.

Implement end-to-end network management oversight, while recognizing the need to segment site level operations/management domains in response to an organization's security and business needs. The resulting management structure will be hierarchical at the management domain level and peer-to-peer at the site level.

Define system management metrics based on need. Enormous amounts of data regarding system performance may be counterproductive.

Partition the system by creating a multidomain structure with different “views” into each domain. By doing this, a single network management platform can be used by two or more groups simultaneously, while keeping information segregated.

Connect LAN analyzers at the site level to perform detailed monitoring on network components. Too much data is generated by these tools for direct use on the TCS except on a spot basis.

Implement groupware to leverage productivity. The network management system should be viewed as a part of work flow automation, facilitated through the exercise of distributed group problem solving. Assign responsibility clearly throughout the problem routing and tracking process.

### **Implementation Considerations**

In implementing the management and control system, it is important to consider the cost of additional services and devices, and the associated system overhead costs. Careful analysis needs to be made to ensure maximum benefit is provided for the least cost.

SNMP can consume a lot of overhead because it uses a distributed polling hierarchy.

There may be a temptation to rely upon a large number of management tools for collection of network statistics. The amount of data to be collected and their level of detail need to be matched with requirements. Then, decisions should be made regarding the relative importance of the data to be collected versus the network delays in production resulting from operation of the tools.

It is more economical to turn on certain management and control mechanisms in response to



specific problems than to require continued reporting.

The management system represents the single most significant vulnerability of the TCS. Access to and control of information related to the network must be protected.

In the evolving management system, easily customized Commercial Off-the-Shelf (COTS) products will be preferable to customized management software.

The use of well-designed network management tools is extremely important. Use of good tools alone, however, is not sufficient for solving problems across an enterprise network. For network problem solving, good tools must be used in conjunction with effective coordination and organization.

Charging a flat rate for network access will promote the attitude that the network is a resource to be used optimally, rather than an expense to be minimized. A flat rate structure also reduces the amount of network bandwidth devoted to management (tracking details on network use) and the number of billing clerks required. Certain services, such as EDI translation, may be billed on a usage basis. Directory services, on the other hand, should not be billed on a usage basis. A final consideration is that a router backbone, if implemented, does not support billing on a detailed usage basis.

### **Measuring Accomplishment**

Network management and control functions must be monitored on a continuous basis--outages, down times, and poor service are quickly noticed by users. Network Management and Control Services added under TCS should be evaluated and measured by user groups, as is done now under CDN. Given the TCS paradigm of a service-based utility, metrics for new services must be defined clearly by user groups and information resources management personnel. Since the CDN has begun to offer new services, such as Internet access and EDI, associated metrics should be developed as soon as possible.

## **INTRA/INTERGOVERNMENT FINANCIAL NETWORK SERVICES**

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### **Vision**

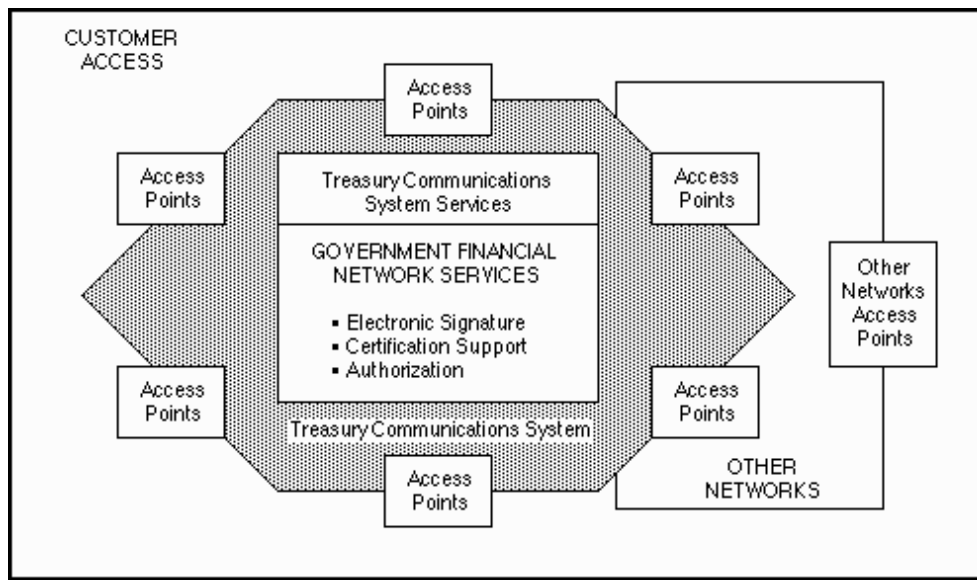
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*Treasury will enhance its leadership role in the virtual networks created by local, State, and Federal government entities by using Intra/Intergovernment Financial Network Services to electronically deliver benefits, process tax- and duty-related information, and coordinate a full range of banking activities.*

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### **Vision Foundation**

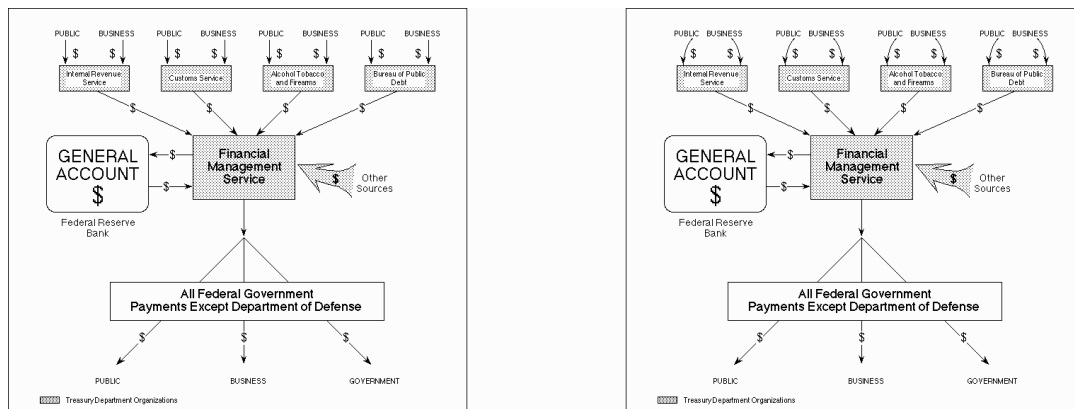
Intra/Intergovernment Financial Network Services must support the electronic exchange of financial transactions and information. Funds transfer, tax and duty collection, direct deposit, entitlement programs, and a variety of commercial and retail banking functions are just a few of the services that could be supported. Intra/Intergovernment Financial Network Services must maintain the authenticity and integrity of information and originators, including associated digital signatures, encryption (as appropriate), and certification authorities. The Treasury Communications System must also support Intra/Intergovernment Financial Network Services as an integral part of Electronic Commerce.



**Intra/Intergovernmental Financial Network Services**

## Overview

The Treasury Department and its associated bureaus are integrated into the fabric of the global financial community. Elements of that community include other Federal, State, local, and foreign governments as well as the private sector. Information is shared electronically within the financial community today, but this sharing is limited. Better use could be made of today's technology. Support of Intra/Intergovernment Financial Network Services should become an integral part of the TCS and complement Electronic Commerce initiatives. The general flow of financial information can be seen in the Exhibit below, "Treasury's Role in the Government Financial Network."



**Treasury's Role in the Government Financial Network**

Intra/Intergovernment Financial Network Services can greatly enhance and expedite such information/data exchange as: 1) electronic funds transfers (between government agencies and financial communities); 2) direct deposits (between government agencies themselves and members of financial communities); 3) tax, duty, invoice and fee payments (e.g., Federal/State taxes, U.S. Customs Services duties, intragovernment acquisition, travel, and training); 4) accountability and reconciliation (e.g., Bureau of Public Debt [BPD] securities and financial transactions or Financial Management Service [FMS] reconciliation of check payments); 5) government cash management and forecasting (as required by the Chief Financial Officer Act of 1990); 6) criminal investigations (e.g., bank fraud and money laundering).

The IRS, Customs, Alcohol Tobacco and Firearms (ATF), and BPD are engaged in the collection of revenue. FMS is responsible for the reconciliation of Federal expenditures. Any integration of the various financial systems within Treasury effected by initiating TCS services, should be under the direction and guidance of the FMS.

The TCS could provide the communications media for government financial services organizations as they migrate from computer systems maintained and operated independently by government organizations to a unified infrastructure. This unified infrastructure could support reengineered workflow management processes by making information available to authorized users and applications, with minimum data entry required by reporting entities.

The required reporting of employee withholding taxes illustrates how this process might work. Employers today are required to supply employee withholding information to numerous Federal, State, or local government organizations. A unified financial infrastructure would minimize the burden on employers by consolidating this reporting as in the Simplified Tax and Wage Reporting System (STAWRS). A financial information service center would make updated employee information available to all authorized government organizations. As an other example, the FMS is developing an Electronic Benefits Transfer (EBT) prototype as a Federal-State model for the delivery of benefits.

## Issues

### RELIABILITY, SECURITY, AND AVAILABILITY

TCS performance, as related to financial services, must be highly reliable, secure, and redundant where necessary. The service, as supported by TCS, must be responsive to all the operational parameters of the FMS. This support may include separate physical communications paths to specific geographical locations to support critical real-time missions and isolation of the FMS virtual network from other TCS users.

### STANDARDS

Current, common financial and related information exists in different formats and databases. Common standards consistent with Electronic Commerce conventions must be adopted enterprise-wide. Internetworking, interoperability, EDI translation, and other common services could be provided by the TCS.

### DIGITAL SIGNATURE

Digital signature technology to replace handwritten signatures must be available to protect and authenticate electronic transactions. Protected network access must extend between and among networks, in recognition that financial networks have strict end-to-end security requirements. The ability to support these requirements when multiple networks are involved requires a variety of protective measures, including organizational oversight and certification of combined network operations.

**Strategic Directions**

Establish a Treasury-wide Financial Network User Group to define the systems and associated services within the Department that can be supported by the TCS. Evaluate, in particular, the Simplified Tax and Wage Reporting System as an example of intra/interorganizational cooperation.

Select the initiatives within the commercial EDI conventions relating to financial transactions that could be incorporated into the TCS. Participate in Electronic Commerce Acquisition Team (ECAT) activities.

Coordinate with the National Institute of Standards and Technology (NIST) and members of the financial community to establish standard procedures and mechanisms for using digital signature technology for financial applications. Include use of digital signatures for public access and user certification.

**Implementation Considerations**

Providing a unified financial service requires integration of information resources and communications networks. Financial services are executed in different organizations and may support a variety of functions. Common applications and the benefits of sharing data must be defined.

**Measuring Accomplishment**

The establishment of a Treasury-wide group to identify desired Intra/Intergovernment Financial Services for the TCS is a first step and should be accomplished soon to take advantage of the TCS build-out.

The development of a financial information infrastructure supported by the TCS will change workflow management processes. This change must be carefully monitored for realization of the anticipated benefits.

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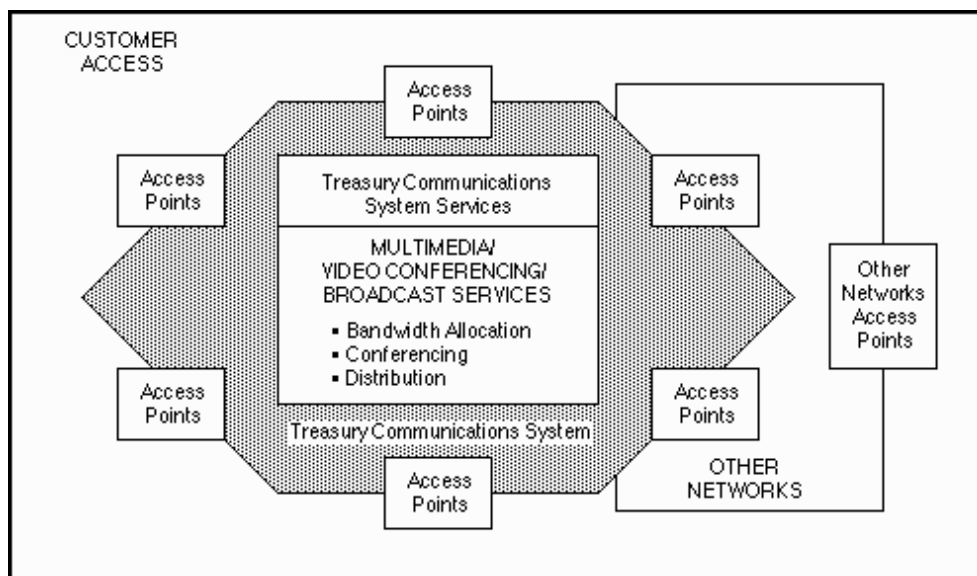
## **MULTIMEDIA/VIDEO CONFERENCING/BROADCAST SERVICES**

### **Vision**

*TCS users will select convenient desktop and group alternatives for information exchange, conferencing, and training, by selecting from an extensive array of state-of-the-art technologies, available through Multimedia/Video Conferencing/Broadcasting Services.*

### **Vision Foundation**

The Multimedia/Video Conferencing/Broadcast Services of the TCS must support a cost-effective, efficient, and unified service for the transmission of video, image, and voice, across an integrated network. This service will provide video conferencing/broadcast services to authorized users, government and public, having access to multimedia computing environments.



**Multimedia/Video Conferencing/Broadcasting Services**



## **Overview**

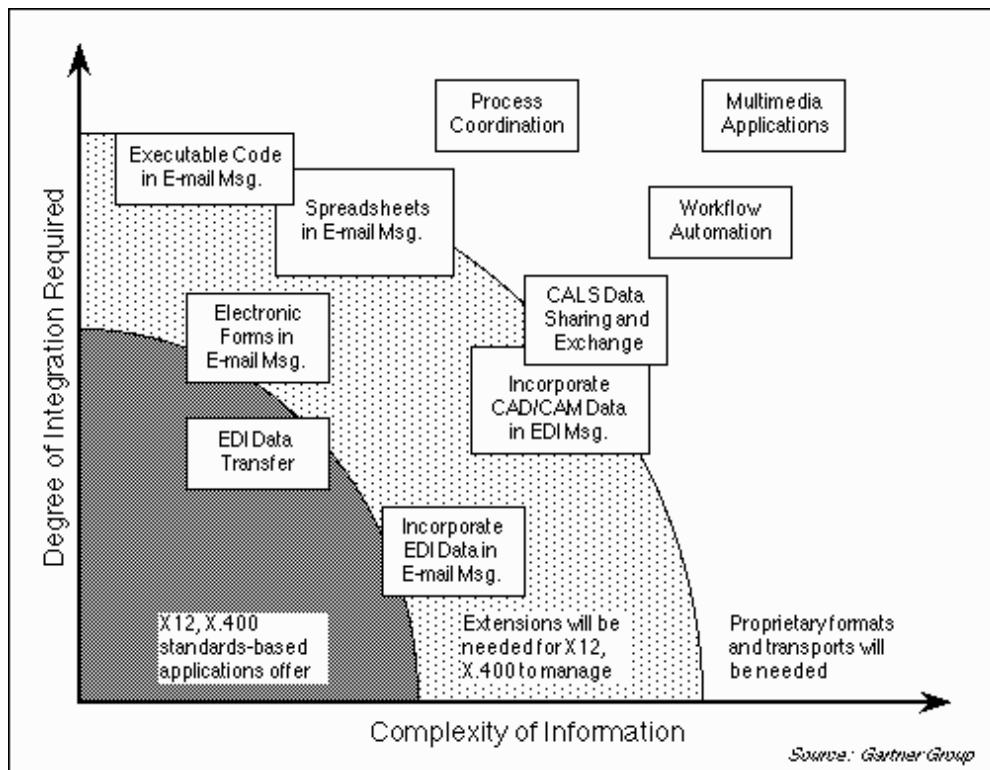
Nearly every U.S. Treasury Department bureau and agency has identified a need for video conferencing and broadcast services, but today the different standards employed inhibit the ability to share resources. This limits the use of common services on a Department-wide basis.

To address common bureau needs and to take advantage of evolving multimedia applications, the U.S. Treasury Department requires cost-effective, unified services for applications, along with the integration of computer workstations.

Video, pictures, and any form of information to be stored or exchanged in the process of doing business, will ultimately be in binary digits. The future presents the user with the promise of having the world of information available on a desktop computer screen, mixing sound, text images, and full motion video as easily as an E-mail message is displayed today.

Video conferencing frees users from the limits of space and time. This technology allows users to participate in meetings hundreds of miles away, without the cost, loss of productivity, and inconvenience associated with long-distance travel. It also offers the ability to review proceedings at another time. Collaboration on documents is facilitated through a combination of high-resolution stop-action video and audio for viewing documents or white board notes as they are written. Multimedia access for training is invaluable, especially when learning is enhanced by using interactive software for immediate feedback.

Several factors that cloud the image of the future must be considered in the evolution to a true multimedia environment. One factor is bandwidth or the bits per second transmitted. Image transfer requires a bandwidth capacity that is unavailable in currently installed LANs and costly for backbone networks. Format and transmission incompatibilities among distributed networks are another problem. The complexity of integrating various user groups is illustrated in the Exhibit, "Information Requirements and Information Complexity."



### Information Requirements and Information Complexity

Cost-effective implementation of multimedia capabilities will be realized as the communications capacity increases to the desktop and various standards for format and transmission converge.

**Issues****MULTIMEDIA ARCHITECTURE**

Transmission of video and graphics requires increased bandwidth and computer processing power for effective use. User groups who require this capability need to consider all aspects of the system to support its introduction. An architecture that includes the local network, workstations, servers, and the associated TCS service must be developed.

**SECURITY**

The ability to protect information is complicated in a distributed processing environment. Protecting multimedia applications represents an additional challenge. The sensitivity of the integrated information transmitted must be assessed and used as a guide in protecting the various media.

**BUSINESS CASE FOR MULTIMEDIA AND VIDEO**

The cost of additional bandwidth and high speed processors requires that requests for multimedia and video services be reviewed for their business benefits. TCS service should be the natural derivative of user requirements. Near term applications can be implemented locally to reduce the cost of bandwidth because of the ability to interconnect local facilities through the TCS and the application of compression techniques to reduce bandwidth requirements.

**INCOMPATIBLE FORMATS**

Diversity in the media (as well as the variety of available equipment for storage, compression, and display) affect implementation requirements. Standards for evolving multimedia applications are not mature.

**IMAGE TRANSFER**

Capacity for image transfer must be provided in a cost-effective manner.

**Strategic Directions**

Establish a Treasury-wide Multimedia/Video Conferencing/Broadcast Services Working Group to identify Treasury Department success factors and technology price/performance scenarios prior to planning multimedia service offerings. The service offerings of the TCS will address

the ability of the user organizations to accommodate bandwidth demands. Coordinate the use of FTS2000 and LTSS capabilities to increase available bandwidth as cost-effectively as possible.

Identify Treasury Department success factors and technology price/performance developments prior to planning multimedia service offerings. Enterprise success factors include: mission objectives, cost-effectiveness, flexibility of response, reaction speed to change, quality, capacity planning, and system scalability, reliability, and robustness. The service offerings of the TCS must also address the ability of the user organization to accommodate the bandwidth demands.

Examine the real value of video for conferencing purposes to determine whether high resolution stop-action video (providing information content, such as results of a spreadsheet, documentation, or presentation, and offering the capability of passing control of the keyboard) is what is really required rather than video conferencing. In the former case, productivity gains are realized over the existing LAN, without creating bandwidth demands and can serve as a means to transition to a more robust capability as technology matures.

Leverage Treasury's visibility to form strategic alliances to develop alternatives for major applications as part of a standards development process. TCS management should maintain awareness of evolving technology and keep appropriate organizations apprised of capabilities as they develop.

Implement a variety of common, instructional programs for Treasury personnel.

### **Implementation Considerations**

The cost of the chip set will ultimately determine the installation cost of high speed data switches and will decrease over the next few years. The implementation of multimedia services should be done in stages, according to business need. More marginal applications should be implemented when costs are lower.

Managing video services may be more important to a user group than having real-time conferencing capability. Users may want to be able to playback a video tape or use recorded conferences at a later time. Control of multimedia services must be defined.

Multimedia to the desktop can be implemented by using the LAN or the WAN backbone, with the PC as the primary interface. An early implementation alternative is to use the enhanced voice network and an extended switched service.

There are two aspects to multimedia communications: compound documents (comprised of imaging, scanned documents, large files, database copies, drawings) and real-time

transmissions. The scope of the particular multimedia application and its business use should be evaluated.

Voice, data, and document content are readily available with desktop conferencing products, good access, and agreement on standards without the expense of full motion video. This alternative needs to be appreciated and considered in the evolution of full multimedia services.

### **Measuring Accomplishment**

A Treasury-wide user's group should be established to review the current industry capabilities, pilots, operational systems, and planned programs with the objective of integrating different Multimedia/Video Conferencing/Broadcast Services within Treasury. This group should also define the magnitude of the need, according to business criteria, and establish necessary performance criteria for this TCS service.

## **NETWORK-BASED COMPUTING SERVICES**

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### **Vision**

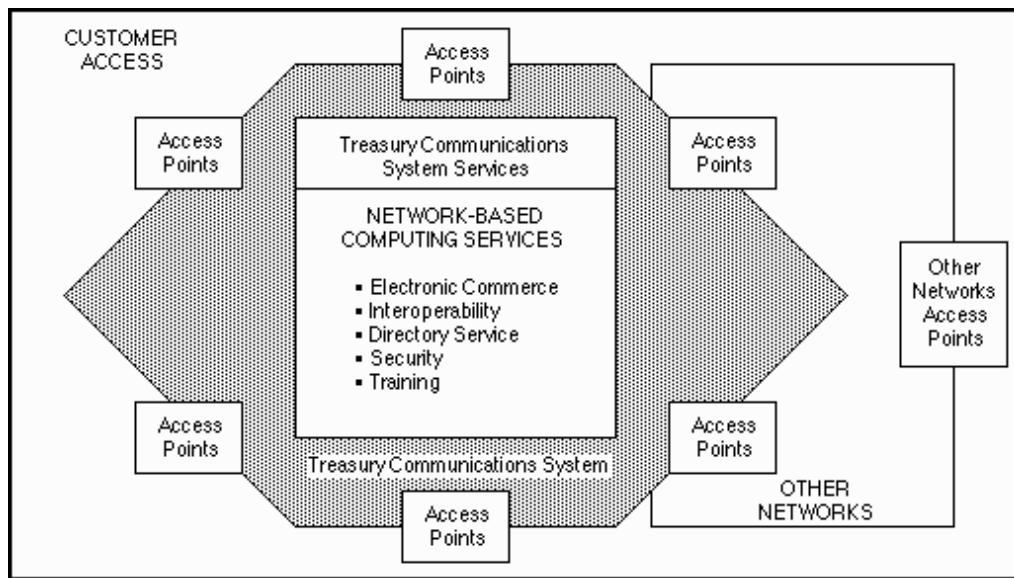
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*Network-based Computing Services will empower TCS users with privileged access to a menu of information and computing resource tools, through value-added Core and Extended Services that include standards-based messaging and directory capabilities, shared databases, and security protection.*

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### **Vision Foundation**

Network-based Computing Services of the TCS can provide a variety of value-added services for enhancing distributed computing and connecting user applications for routing, processing, and sharing of databases. Network-based Computing Services will consist of Core Services and Extended Services. Core Services will meet basic operational and management requirements through value-added services such as electronic mail, directory services, EDI translation, billing, and procurement. Extended Services will meet customized requirements beyond the Core Services for specific applications, such as public access to government information, interactive mobile computing, special security authorizations, and extended LAN-to-LAN services.



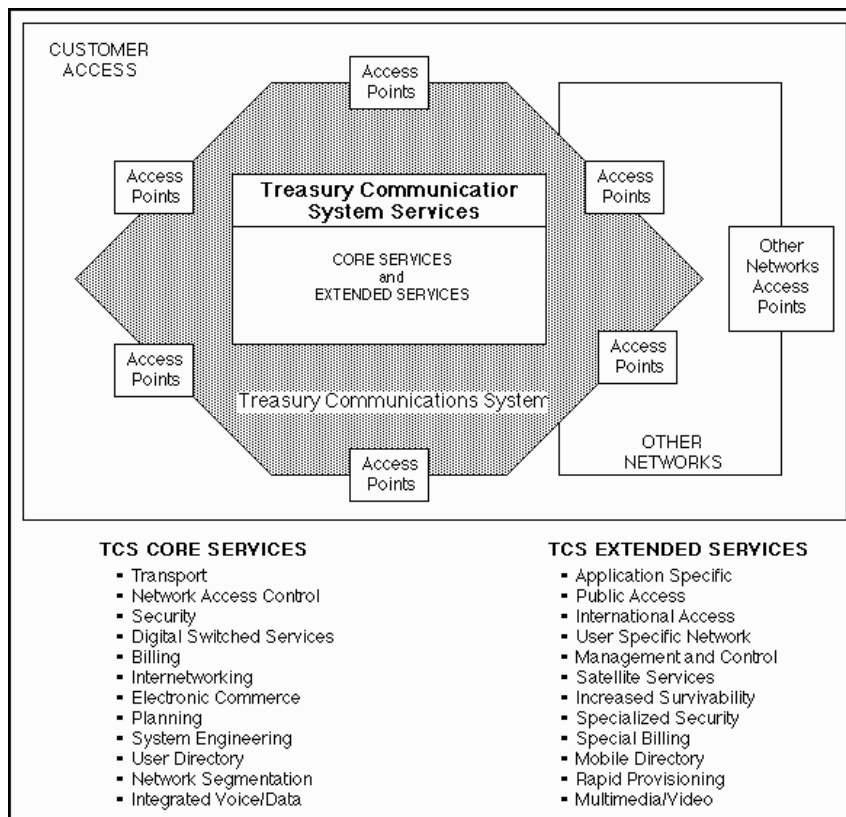
**Network-Based Computing Services**

## Overview

The boundaries between computing and communications are blurring. The network is emerging as a general-purpose information technology enterprise that offers a variety of network-based computing services in addition to transport services. In this new paradigm the network acts as an integrated computing service. The TCS service-based utility will combine telecommunications and an information infrastructure, directing data to authorized users as necessary.

Network-based Computing Services can support a number of applications important to Treasury operations. The centralized computing services can enable information exchange where disparate systems and application software are in use. The computing services make connectivity possible among user communities during the transition period until a common end-user standard is accomplished.

Computing services, as an integral part of the TCS, are a natural outgrowth of the computing process related to the management and control of the network. The Treasury Communications Center is the best location to integrate the computing services with the management and control of the network. The network-based computing services also could be located at or near the user population to minimize network costs and network congestion. The management of the network-based computing services should be centralized at the Treasury Communications Center to maintain service quality and minimize resource expenditures (see Exhibit, "TCS Services").



### TCS Services

The integration of the various computing services evolved as a natural consequence of the manpower and facilities required for TCS Network Management and Control Services. The availability of a consolidated resource in the Network Operations Center plus a need to protect information being accessed by the general public or selected user groups, prompted the concept of Information Service Centers as part of the TCS. The Information Service Centers represent the central management of the resources which contain information managed and controlled by Treasury organizations.

### Issues

#### STANDARDS FOR INTEROPERABILITY

The Network-based Computing Services associated with the TCS will have to support standards for interoperability. These services must also support legacy systems and promote the transition to a unified set of standards. This is a complex issue that requires clarification of standards used among affinity groups.

#### ACCESS CONTROL AND OTHER SECURITY MEASURES



Security control mechanisms that are relevant to the particular service offering must be implemented. Controlled access to TCS Network-based Computing Services is essential and must be audited.

#### COSTS OF SERVICES

The cost for Network-based Computing Services should be based on usage and the particular service provided. An equitable rate structure must be formulated.

#### ELECTRONIC DISTRIBUTION OF SOFTWARE

Electronic distribution of software (updates, changes, etc.) could greatly benefit TCS users, reducing the number of required information processing support hours by as much as 10 percent. This is a task that is highly labor-intensive and yet has high potential for automation. As part of this task, TCS should maintain details about attributes, versions, control of versions, licensing, financial information, and maintenance responsibility.

#### MANAGING COMPUTING RESOURCES AND INFORMATION RESOURCES

The boundaries of responsibility between TCS management of network-based computing resources and user management of information resources must be clearly defined.

### **Strategic Directions**

Make the business case for consolidating identified computing services as part of the TCS in a manner transparent to the user, thus allowing the user to focus on business and operational matters rather than connectivity and interoperability.

Select from some of the services recommended in the Open Systems Forum (OSF) Distributed Computing Environment (DCE), and incorporate these incrementally.

Incorporate Network-based Computing Services incrementally. Evaluate the inclusion of specific service offerings on the basis of results from experimental implementation, such as pilot programs, proofs of concept, and models/simulations.

Establish an initial Treasury Information Center (TISC) that will integrate management of TCS network-based computing resources, transmission connectivity, security, and network management. The center(s) should be located in the Treasury Communications Centers

(TCCs) to maximize service quality and minimize resource expenditures.

Identify computing services which can be improved by consolidation as part of the TCS. Examples of applications are:

- Archival/Storage
- Software Distribution
- Digital Signatures
- Certification Authority
- Electronic Data Interchange (EDI) Translation
- World-wide Web (WWW)

Incorporate several Network-based Computing Services by identifying and implementing service offerings that are applicable to most agencies, such as public access to government information, training, and telecommuting. Evaluate the inclusion of specific service offerings on the basis of results from experimental implementation, such as pilot programs, proofs of concept, and models/simulations.

Establish automated or other methods to monitor delivery and performance of a given TCS computing service to ensure user satisfaction. A user will perceive the TCS as unresponsive if either the computing service or the network is faulty.

Evaluate the feasibility of outsourcing some of the Network-based Computing Services to commercial providers.

### **Implementation Considerations**

Contingency plans for backup and recovery, and especially support for restoring service for critical applications, must be defined.

The Network-based Computing Services will be available to a large and diverse community. This requires a coordinated approach to assure performance.

The network should be used as an agent among members of affinity groups or communities of interest that do not have the same standards. Transition to TCS Network-based Computing Services will require coordination among organizations that need similar services.

Creating a Department-wide naming service that leads to integration of TCS user directories will be a significant task requiring coordination among all Treasury organizations. TCS planners should implement naming conventions for users as soon as possible, and take an incremental approach to providing X.500 Directory Services by building on proven technology and incorporating user feedback.

Security mechanisms for access to TCS Network-based Computing Services must ensure that the integrity of the service and information provided is consistent with the needs of the user population. Treasury organizations must maintain the accuracy of information content.

### **Measuring Accomplishment**

TCS Information Service Groups should be established as soon as possible, prior to TCS award. These groups will define the type, scope, and lead organization for the desired service. The TCS Information Service Groups should be comprised of members with a common interest in using, distributing, and maintaining specified information within the TCS community.

The potential for cost reduction when computing services are consolidated (in terms of manpower, facilities, hardware/software resources, and training) should be carefully evaluated and compared to the cost of continuing independent network maintenance operations within separate organizations.

## **PUBLIC ACCESS TO GOVERNMENT INFORMATION SERVICES**

### **Vision**

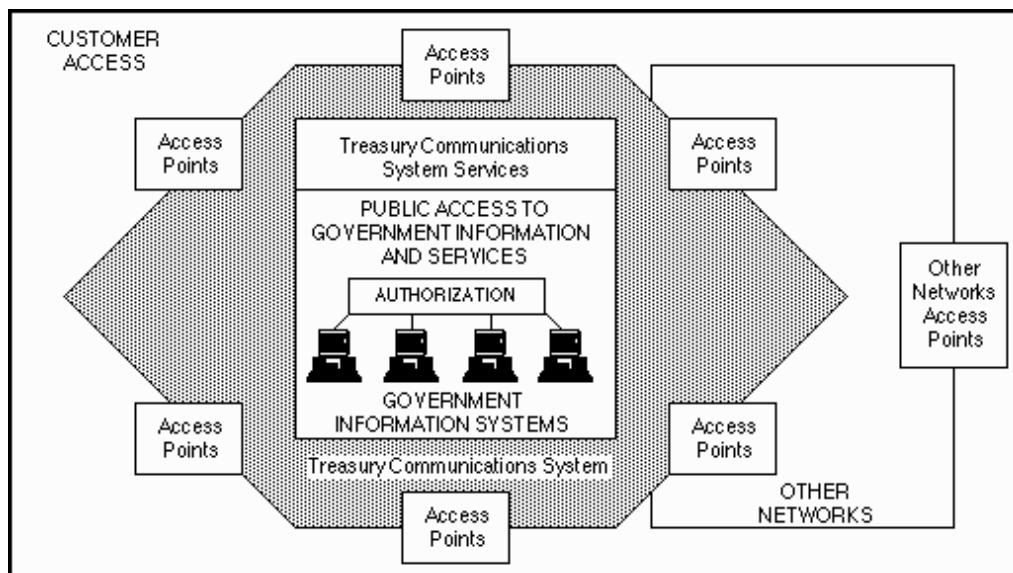
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*TCS users will respond to the American public's desire and need for user-friendly, accurate, and confidential Public Access to Government Information Services by using different combinations of TCS service capabilities.*

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### **Vision Foundation**

Public Access to Government Information Services must be supported efficiently and effectively by electronic media and TCS access methods. Information such as invoices, documents (print, video, or image), orders, forms, and TCS payments must be provided. Services must be expandable to a growing population of individuals and businesses to support the ever-increasing demands on the government to provide the public with quality and timely services. Common, user-friendly information services and access methods to electronically stored data are required.



**Public Access**

## Overview

The Electronic Government lane of the information highway will allow the U.S. public to submit tax returns, status requests, cargo information, electronic payments, invoices, purchase orders, legal documents, and many other business transactions across a communications network expediently and efficiently. Electronic access to Government services also answers the Federal mandate to reduce the burden of paperwork. Electronic access to the tax process, trade information on exports and imports, and other financial data is offered through the TCS Public Access to Government Information Services.

The two most accessible devices for the general public are the telephone and personal computers. Many government public access systems already incorporate the use of these devices. The Treasury Department fully intends to continue their strategic role, including bi-directional communications with U.S. citizens. Treasury information kiosks will provide on-line replies to U.S. citizens questions. Telephone dial-in services are vital links between the public and government services. Under the Tax Systems Modernization (TSM) initiative for example, the objectives of reducing the workload for U.S. citizens and minimizing paper processing are met in the electronic filing of tax returns and electronic transfer of funds or benefits between parties. An excellent example of public acceptance of alternative ways of filing is the TeleFile program. Participants in the TeleFile program, who have been pre-screened to reduce the risks of fraud and error, file their 1040EZ tax information electronically, using the touchtone pad of their telephone. Due to its success, which exceeded IRS expectations, the program has been extended to additional states, with a national rollout anticipated for 1995.

For U.S. Customs, the primary user of information is the trade community. Customs currently supplies information about the status of cargo processing for imports and plans to expand this to exports. Customs will also become the clearing house for providing non-proprietary information on trade to the public. TCS capabilities will make maintenance of, and access to, the U.S. Customs Service (USCS) developed International Trade Database easier and more robust.

## Issues

### PUBLIC USE OF COMMERCIAL NETWORK SERVICE PROVIDERS

The public is expected to use a variety of commercially available network services to reach government information. Internet, CompuServe, America On-Line, public carriers, VANs, and other network service providers will be used. If the TCS is responsible for controlling public access to Treasury government information, TCS

must be capable of interfacing with a wide range of network service providers.

#### TCS CONTROL OF PUBLIC ACCESS

The TCS, acting as the major component of Treasury's Information Infrastructure, must be capable of controlling public access to information designated for electronic distribution by Treasury bureaus through Treasury Information Service Center kiosks and bulletin boards. The TCS may be responsible for maintaining the necessary computing resources; however, responsibility for updating, purging, and guaranteeing correctness of information content should be assigned to bureaus and their organizations.

#### SECURITY

Security provisions must be implemented consistent with the sensitivity level of the information content to be released to the public. Bureaus must be responsible for disseminating only unclassified and nonsensitive information to the general public. Gateways and firewalls are required to block improper access to data and may be implemented by TCS Security Services.

### **Strategic Directions**

Sponsor an inter-bureau initiative to assess the feasibility of, and formulate an approach to, using a single mechanism for implementing multiple access methods for the public to obtain Treasury information.

Establish the Internet and World-wide Web (WWW) as two primary access methods of supporting public access to Treasury and other government information.

Evaluate existing public access programs such as TeleFile to identify measures that could be taken to protect information made available electronically from improper access or use.

Define a Treasury Information Service Center (TISC) infrastructure and design a technical architecture for distributing and controlling access to Treasury Department information and services designated for the public.

Designate the Internal Revenue Service as the primary Treasury agency to pilot the TISC and formulate a consistent public access methodology.

Coordinate the method of distributing Treasury information and services to the public with other Federal agencies in consonance with Treasury policy.

## **Implementation Considerations**

In implementing TCS Public Access to Government Information and Services, a key consideration is the capability for communications connectivity similar to the public telephone system. Access should therefore be accommodated with a dial-up network and Internet capabilities. FTS2000 capabilities may be used to provide 1-800 access for U.S. citizens, as is currently done for IRS TeleFile program participants. The TCS can support the consolidation of information to be accessed in the proposed TISCs.

Information contained in government databases for public access should be indexed for easy reference.

The cost of delivering these public services may be lowered by consolidating information in TISCs and by using FTS2000 to establish 1-800 numbers.

Treasury information for public access must be segregated according to access privileges (for example, read only, file transfer, or query/response). Different access privileges will be assigned in accordance with the sensitivity of the information and the user profile or attributes certificate.

## **Measuring Accomplishment**

Providing Public Access to Government Information and Services via the TCS will occur in several key phases. Currently, the public has electronic access to Federal information via bulletin boards on the Internet and commercial networks. The existing CDN can support pilot programs for distributing and accessing information to the public electronically. Successful programs can then be migrated to the TCS upon its implementation.

Some Treasury bureaus have already begun independent initiatives in support of Public Access to Government Information and Services. The IRS, for example, has successfully implemented a pilot program for filing tax information electronically, using a telephone keypad. It is also considering the establishment of a Direct Access Facility to allow on-line links for taxfilers. A third IRS activity is the development of an External Access Utility that will provide a secure communications gateway for large numbers of electronic filers. The success achieved and knowledge acquired from these and other bureau activities will contribute to realizing the TCS vision for Public Access to Government Information and Services.

Measuring accomplishments pertaining to this vision will require market research techniques, performed by each of the relevant bureaus, to evaluate public satisfaction with the delivery and content of information and services. Since IRS is currently engaged in providing services to

the public electronically, it is well positioned to become a lead Treasury organization to establish relevant performance measurements.



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## INTRA/INTERGOVERNMENT ENFORCEMENT NETWORK SERVICES

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### Vision

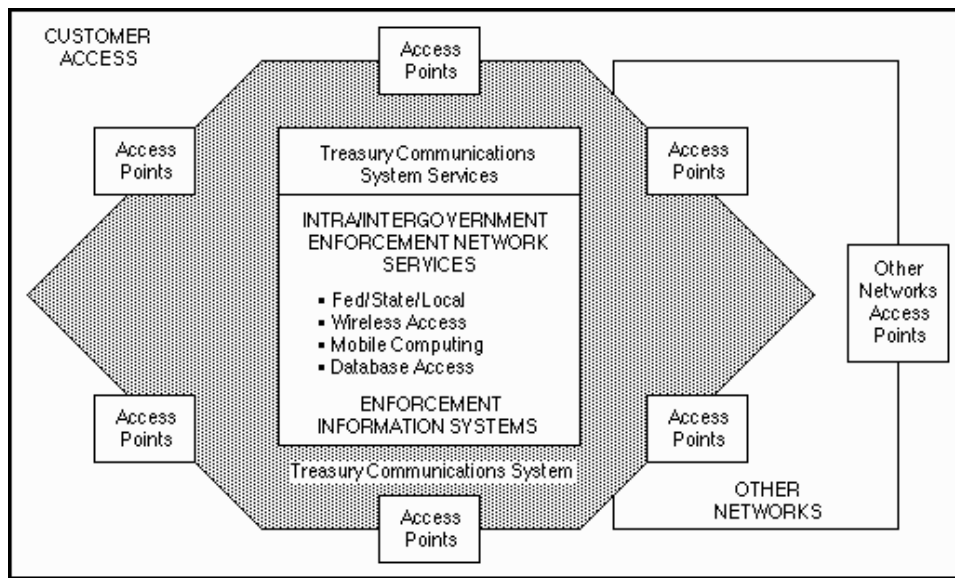
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*Intra/Intergovernment Enforcement Network Services will leverage the best available information technologies to coordinate and achieve successful investigative and enforcement activities at all levels of government, including international.*

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### Vision Foundation

Intra/Intergovernment Enforcement Network Services must provide access to a variety of enforcement databases requiring protected, responsive, and reliable means to ensure authorization and conformance with Federal, State, and local rules and regulations. The Treasury Communications System (TCS) network service must provide access to information for enforcement agencies that conduct research and criminal investigations spanning various enforcement organizations.



**Intra/Intergovernment Enforcement Network Services**

## Overview

Combining innovative information processing techniques and telecommunications technologies offers the enforcement community the tools necessary to combat the increasing number and complexity of crimes with which all levels of government (Federal, State, and local) must contend. Criminal investigations can be enhanced by sharing information on a criminal activity that spans geographic and organizational boundaries. Critical information is often contained in various databases, maintained by different groups that are internal and external to Treasury. Access via a virtual enforcement network to financial, import/export, and firearms information databases could be enabled by the TCS.

New enforcement organizations and information resources have emerged over time as the criminal has found new avenues for exploitation. Within the Treasury Department, for example, the newly formed Financial Crimes Enforcement Network (FINCEN) is dedicated to investigation of financial crime. The investigative process relies on electronic data associated with the financial industry.

The CDN provides the Treasury enforcement community with the ability to access a variety of enforcement databases. The TCS offers a potential to expand this access. The TCS and associated computing services could provide an integrated access to all required enforcement databases with a unified user interface, data conversion, and report format consistent with user need. The TCS could support the necessary protection of both the access to various databases and their content integrity.

## **Issues**

### **DISPARATE DATABASES**

Databases maintained by different enforcement entities vary in form and content. Updating databases with timely information should be coordinated among enforcement organizations. The TCS can provide internetworking services to minimize interoperability problems.

### **SECURITY MECHANISMS**

Adequate security mechanisms for access to, and transmission of, sensitive information must be identified. Special investigations require information from intelligence sources whose classification limits access and requires special handling techniques.

### **CERTIFICATION AUTHORITY**

A Certification Authority needs to be developed that would create and manage certificates to validate identity and access privileges of different enforcement entities and individual users.

### **COST JUSTIFICATION**

The cost of developing compatible enforcement information databases is not supported within separate government enforcement agencies. Cost justification must be developed based upon the reduction of operational time and personnel required to successfully pursue criminal cases.

### **NETWORK INTERFACES**

Interface to the various networks must be responsive and available for the application. The ability to support access to a wide range of information databases must be accomplished without undue delay to the user.

## **Strategic Directions**

Establish Intra/Intergovernment Enforcement Network Services as part of the TCS to facilitate the access to separate enforcement databases within the Treasury Department. Support connectivity to the networks of other enforcement organizations and those within extensive information resources, such as DISN.

Establish a Treasury Intra/Intergovernment Enforcement Network Group to identify the required information, databases, and desired product of an integrated TCS Information Infrastructure for enforcement and investigative purposes. Take an incremental approach to consolidation and distribution of the information in accordance with developments within the separate organizations and in user requirements. Promote connection to the network first, then migrate to a common integrated information infrastructure, supported by network-based computing.

Partition the TCS into subnetworks to accommodate the special needs of the enforcement community. The partition must be able to support multiple levels of security, user access control, and wireless communications.

Establish standard security mechanisms for all Federal, State, and local access to an integrated enforcement database.

### **Implementation Considerations**

The implementation of Intra/Intergovernment Enforcement Network Services must take into consideration the laws which restrict the consolidation of personal data about U.S. citizens. Proper automated and procedural controls must be considered to ensure access is consistent with the mission objective and legal restrictions.

### **Measuring Accomplishment**

The Treasury Department should chair an enforcement task force to develop the concept of TCS Integrated Enforcement Information Services. The group could evaluate the relative merits of performing activities within separate organizations and unifying those activities. Once the concept has greater definition, the service can be expanded as an integral part of the TCS and other enforcement organizations external to Treasury.

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## WIRELESS COMMUNICATIONS SERVICES

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### Vision

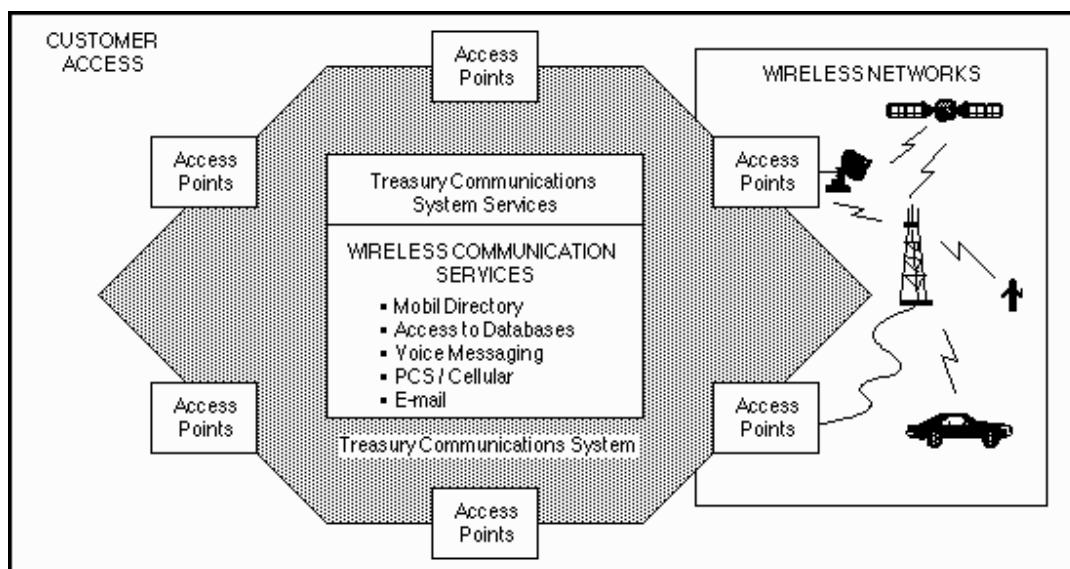
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*TCS users will require interoperable, transparent, and secure Wireless Communications Services to pursue corporate objectives regardless of geographical location, mobility, natural disaster and emergency conditions, desired application, or preferred communications media.*

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### Vision Foundation

Wireless Communications Services supported by the TCS will accommodate access to databases and services available on a variety of private and/or commercial wireless systems. Services desired are characterized as digital, ubiquitous, interoperable, transparent, and secure. They will provide users with data, facsimile, digital paging, mobile computing, and imaging services for diverse applications. Security features for network access to and from the wireless community must be supported, particularly with respect to sensitive information.



**Wireless Communications Services**

## Overview

The explosion of new technologies in emerging wireless services can enhance enforcement operations and on-site audits. Wireless networks include radios used for Federal, State, and local enforcement/public safety, personal communications services, mobile satellite systems, wireless Local Area Networks (LANs), and enhanced cellular systems. The Federal Government and specifically, the Department of Treasury, view the evolution in wireless service technologies as a means to enhance the effectiveness and productivity of mobile or remote enforcement and safety operations.

Increases in the demand for wireless communications during the 1990's has grown exponentially, and the trend is expected to continue into the 21st century. With increased emphasis on this technology within the communications and computing industries, wireless communications services will evolve as a viable and integrated access to the more predominant wire- and cable-based networks. From a user interoperability standpoint, whether in the area of public access to government information or intergovernmental networking services, wireless is expected to play a role in providing mobile paths to information services. For example, wireless LANs offer flexibility and independence of physical building wiring and thus could be used to set up temporary office sites. IRS, USSS, USCS, TIMIS, and BEP have all expressed a future need to accommodate wireless access to a variety of databases.

## Issues

### INSTABILITY OF STANDARDS

Standards for the next generation of commercially available products and services are in an early formulation stage, as are data standards and network management systems associated with the wireless community. At present, a variety of mobile digital systems are available and under development that are incompatible with respect to voice processors, modulation schemes, and access techniques.

### ORGANIZATIONAL COORDINATION

Geographic locations and government organizations for wireless access to the TCS need definition and coordination across organizations and associated databases.

### SECURITY

The public sector consumer of wireless products has not demanded security as a primary feature. As a consequence, it is unclear what security services will be

commercially available without Government support.

#### COST

The billing rate structure for shared wireless systems, private and commercial, must be determined.

### **Strategic Directions**

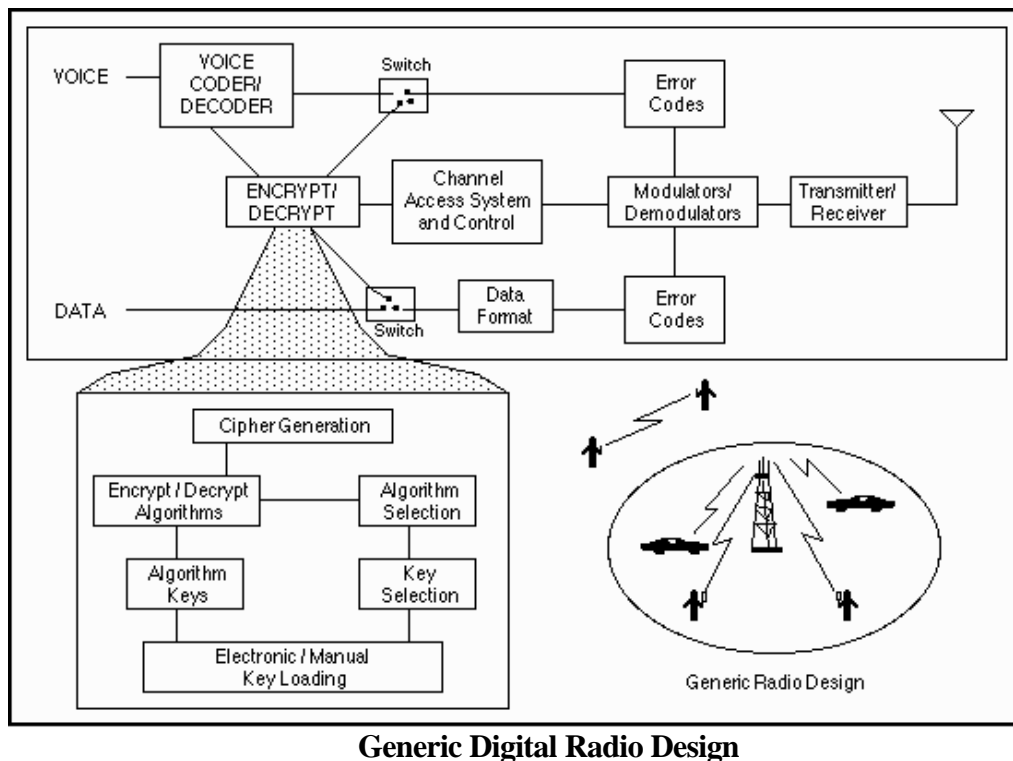
Maintain the focused approach initiated in 1991 for Wireless/Radio Service and Support (WRSS) with the continued involvement of the Federal Law Enforcement Wireless Users Group (FLEWUG). Broaden the scope to include TCS protocol standards and network management to accommodate user-friendly access to secure data and interoperability with the law enforcement community at large. Standard commercial techniques for data access should be incorporated for message traffic, such as those being developed in the Project-25/Telecommunications Industry Association (TIA) groups for the next generation digital public safety radio.

Establish standard security techniques for all Federal, State, and local radio systems. Close coordination between the Departmental security office, TCS, and Treasury organizations is required.

Identify wireless needs and applications based on sound business decisions. Bureaus must define their individual requirements for wireless interfaces with associated LANs and the TCS. In addition, introduction of the new wireless services must allow the use of both old and new technologies.

Support the design for a multi-functional radio which can accommodate backward compatibility and forward requirements. The increased processing power available in future designs can support a family of radios with greater interoperability (see Exhibit, "Generic Digital Radio Design").





**Generic Digital Radio Design**

Initiate a process to establish a data channel (frequency allocation) for wideband operation that is not limited to the new narrowband channels of 6.25 or 5 kHz. This data channel would support imaging and other high bandwidth applications.

Introduction of the new wireless services must allow the use of both old and new technologies.

### Implementation Considerations

The various digital radio systems (cellular, public safety, satellite) have different voice processors and modulation techniques which will require a gateway between systems for communications and access to data through the TCS.

The allocation of narrowband radio spectrum will have an impact on the technology selected to provide a particular type of wireless service. Both will affect the effective throughput (i.e., data rate) available to the mobile subscriber. The reforming action of the Federal Communications Commission (FCC), proposal to allocate radio frequencies on five (5) kHz channels from the current 25 to 30 kHz channels will increase the available frequencies to be assigned. It will, however, limit the data rate to mobile users, per allocated narrowband channel.

Procedures to resolve potential conflicts between voice and data use in a wireless environment with limited spectrum availability must be established.

**Measuring Accomplishment**

Affinity user groups, such as the Federal Law Enforcement Wireless Users Group (FLEWUG), will evaluate TCS support for providing appropriate interfaces for wireless access. This group and other Treasury user groups will establish procedures to determine operational requirements for remote and mobile access to the TCS using value added service providers. Direct wireless access is technically feasible, but has not been identified as a Treasury requirement. Direct access could address the mission needs of users for enhanced and unified security gateways. Interface details must be coordinated with network service providers to realize the potential freedom to operate in a mobile environment.

Measurement of progress on achieving wireless access capabilities should begin with TCS development. Efforts to promote standards that are consistent with access to TCS or related networks should be made among members of the mobile community.

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## TELECOMMUTING SUPPORT SERVICES

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### **Vision**

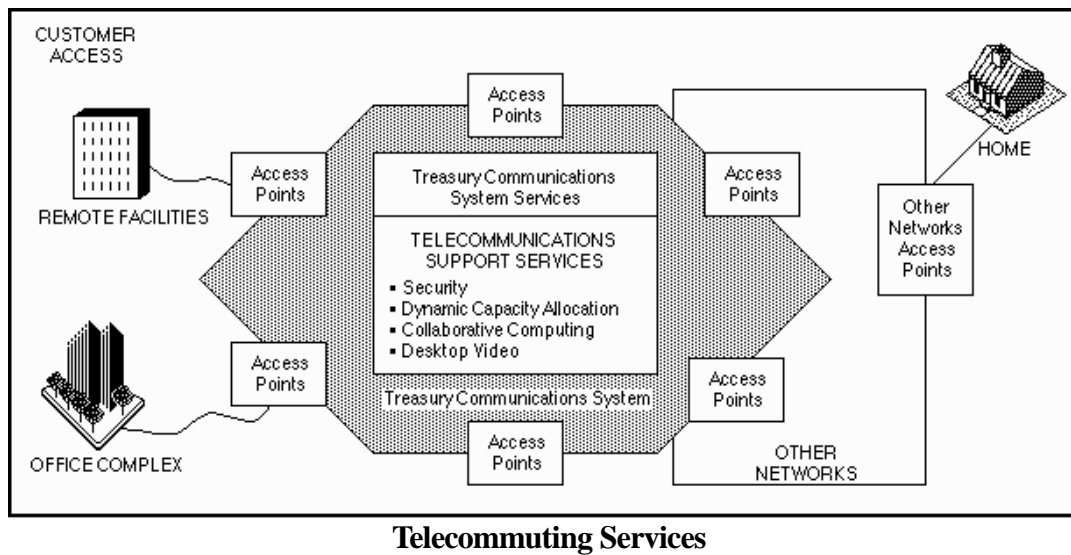
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*Telecommuting Support Services will promote and support collaborative work efforts by linking TCS users at dispersed locations, thus increasing productivity, maintaining essential business services under exceptional circumstances, and encouraging employment of individuals covered under the Americans with Disabilities Act.*

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### **Vision Foundation**

Telecommuting Support Services must offer access to network-based computing services for designated U.S. Treasury Department personnel from remote locations. Remote locations may include: personal residences, shared remote offices (such as GSA satellite centers), travel sites, and other non-traditional work places. Telecommuting Support Services must be flexible and provide the full range of network-based services where technically feasible and required. The TCS will support the objectives of telecommuting, networking a variety of workplace settings, with the ability to support continued operations in the event of natural disasters and adverse environmental conditions.



## Overview

The modern work environment, with its emphasis on customer service, is leading government agencies to reform their traditional centralized operations into more dynamic and responsive units. At the same time, government agencies must conform to new State and Federal laws which govern work places as well as dictate alternative work sites. Telecommuting offers Government personnel the flexibility to better serve users both inside and outside the government by allowing employees access to network services and information resources from locations other than traditional work sites. These alternate work sites support such diverse requirements as short and long term details, work-at-home, pooled remote locations, employees on travel, and contingency work sites for the continuance of essential operations during times of disaster, national emergency, or adverse environmental conditions.

A major advantage of TCS Telecommuting Services is the more effective use of time and space. The number of hours spent in rush hour traffic in major cities could be reduced if an individual worked from his or her residence, with any commute to and from the office done at non-peak hours. Or, the individual could work from his or her residence on certain days of the week or for longer periods of time. Another possibility is to work from a remote site that is designated for telecommuting. GSA satellite centers, for example are facilities shared by more than one government organization. Consolidating Government personnel at such facilities can reduce the costs associated with maintaining old or obtaining new facilities. The benefits are not only increased personnel productivity, but also a cleaner environment, reduced waste of energy resources, and streamlined budget outlays.

Functions that could be accomplished via TCS Telecommuting Services and accommodate a varied work schedule independent of geographic location are:

- Preparation and receipt of electronic correspondence
- Collaborative and workgroup computing
- Meetings by desktop video or video conference
- All other activities where physical presence is not required at the headquarters site

## **Issues**

### SECURE ACCESS

Secure access in the new remote computing environment is especially critical. Password protection will not suffice. A combination of physical, automated, and procedural mechanisms will be required to ensure that individuals who use TCS Telecommuting Support Services are identified accurately.

### COST

The cost of telecommuting should be evaluated according to overall productivity, including any benefits associated with remote training programs and reduced long distance travel. Computer hardware, software, and telecommunications costs should be supported by the employer.

### MANAGEMENT

The management of telecommuting personnel should be consistent with Departmental and bureau-level policies. Specific measures and period of performance must be established. Sharing remote sites, that could also be secure sites, should be an objective.

## **Strategic Directions**

Implement a TCS interface to GSA satellite centers.

Develop guidelines for evaluating the benefits of using existing Treasury facilities in a

multibureau manner.

Perform a demographic study of Treasury personnel residences cross-referenced to existing Treasury facilities.

Establish a TCS Telecommuting Group consisting of bureau representatives to identify and justify pilot projects for TCS Telecommuting Services. This group should also establish criteria to evaluate alternative work facilities and Treasury employee requirements for access to automated information systems to perform their jobs on a “flex place” basis.

Design and implement selected pilot programs to test telecommuting concepts such as worker productivity levels.

Define a TCS telecommuting support infrastructure to determine requirements for automated information resources at alternative (i.e., non-Treasury) work sites. Include plans for leveraging ISDN technology (for increased bandwidth), LTSS and FTS2000 capabilities, and video conferencing.

Implement TCS access control and other security procedures to support telecommuting and reduce vulnerability of data to improper remote access and use.

### **Implementation Considerations**

The business case for offering telecommuting as a work option should be determined within individual bureaus, according to specific mission criteria. The costs and benefits associated with using alternative work sites, such as the GSA satellite centers, should be assessed.

Telecommuting should also be considered as a fiscally responsible alternative to long distance travel for training, conferencing, or troubleshooting purposes. Both the indirect costs of travel (e.g., inconvenience, decreased worker productivity) as well as the direct costs (e.g., per diem expenses, transportation) are variable costs that can have a significant impact on bureau budgets.

It will probably be necessary to reevaluate existing workflow management processes and define processes that most effectively leverage the potential benefits of telecommuting. Training programs for managers and employees may have to be developed to ease the transition to non-traditional work sites.

### **Measuring Accomplishment**

The measures of accomplishment should be consistent with the measures of current work

efforts. An objective measure would be the cost of implementation and maintenance of telecommuting compared to productivity gains, improved employee morale, and reduced travel costs.



## **TREASURY INFORMATION SERVICE CENTERS**

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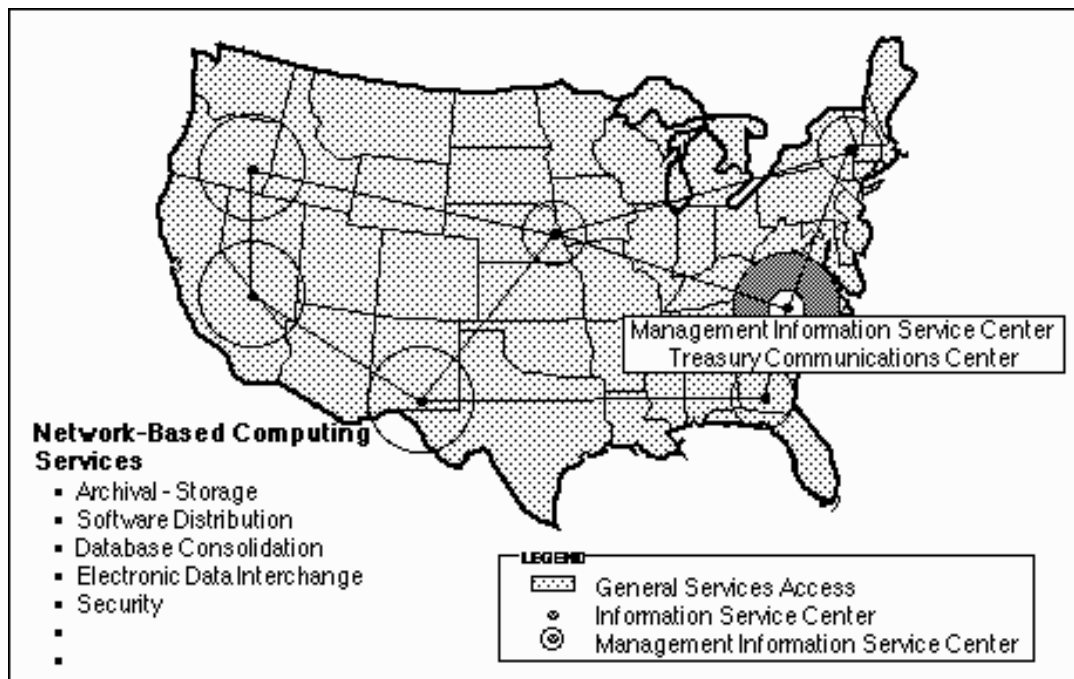
The concept of establishing Treasury Information Service Centers (TISCs) was derived as a cost-effective solution to support the integration of the various computing services articulated in the corporate visions. Multiple visions pointed to the need to have network-based computer processing resources to meet present and future user requirements. The value of combining conventional information processing and telecommunications activities is a current topic within the information technology industry. A number of benefits are anticipated from such a consolidation, including:

- User friendly perspective - from the user perspective, information processing and telecommunications are already combined; a user would be more comfortable going to a single help desk for any problems.
- Physically separated location - computer resources dedicated to distributing information to the general public via Internet or World-wide Web can be isolated from operational systems.
- Improved bandwidth allocation - telecommunications personnel control bandwidth allocation, which has an impact on information processing activities.
- Improved budgetary perspective - components of telecommunications and information processing budgets overlap and can be unified to eliminate costly administrative redundancy.
- Facilitated problem-solving - problem-solving efforts can be reduced between telecommunications and information processing activities.
- Improve external communications security - dealing with the general public and external trading partners reduces issues involving security, including concerns about firewalls and placement of resources.
- Reduced management complexity - optimized performance and overhead use were concerns of the 1980s, now replaced by concerns about management complexity, interoperability, and ready response to changing business needs.
- Enhanced user productivity - shifting the emphasis from device management can enhance productivity of Information System (IS) staffs.
- Simplified implementation of relevant standards-based technology.

- Uniform addressing and routing schema.
- Synchronized databases and access procedures.
- Conservation of valuable resources - redundant activities can be reduced through consolidation.

TISCs would integrate management and control of TCS computing resources and communications with security and network management. These centers would be a consolidated resource collocated with the Network Operations Centers to maintain service quality and minimize resource expenditures. The TISCs would also coordinate protection of information that is managed and controlled by Treasury organizations to which access by the general public or selected user groups is allowed. The TCS would provide the supporting infrastructure for the TISCs; however, responsibility for updating, purging, and maintaining correctness of information content would be assigned to the responsible information processing organizations of the bureaus.

TISCs would locate services for traffic volume and communities of interest, as shown in the Exhibit, "Treasury Information Service Centers." Examples of service offerings could include:



**Treasury Information Service Centers**

- Archival - storage
- Software distribution (including monitoring of licensing, attributes, versions, financial information, responsibility)
- Training Services (including user familiarization, ownership, teletraining, audio/visual)
- Consolidated Mailbox Services
- Distribution of Government Information to Citizens
- Digital Signature Support
- Electronic Data Interchange Services
- World-wide Web Access
- Security Services, including password and electronic key

TCS Information Service Groups should be established as soon as possible, prior to TCS award. These groups will define the type, scope, and lead organization for the desired service.

The TCS Information Service Groups should be comprised of members with a common interest in using, distributing, and maintaining specified information within the TCS community.

These groups will continue some of the essential work of managing the evolution of the TCS strategically, that is, beyond day-to-day management. The need for continuous change management and monitoring of TCS implementation was factored into the formal strategic planning process used to develop the TCS Strategic Plan.

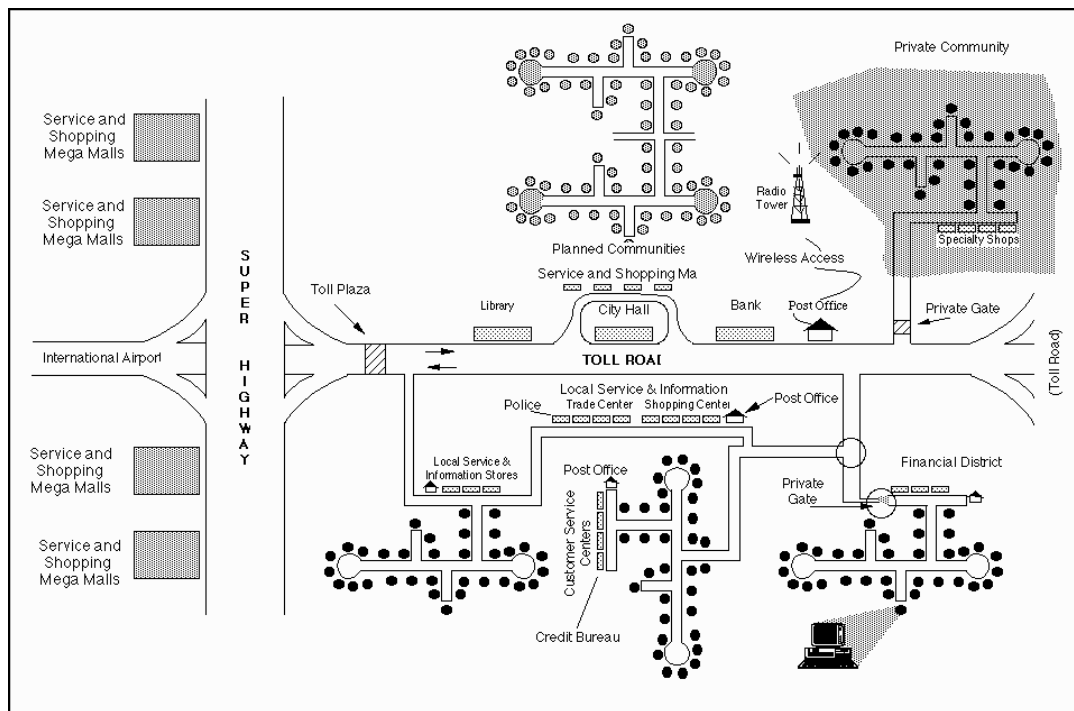
## **THE TCS VISION**

### **"A Treasury Information Infrastructure"**

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The overall TCS vision is shaped by the 12 corporate visions that indicate the value of migrating from the current CDN to a combined telecommunications and information services utility that will become the Treasury Information Infrastructure. Vice President Gore has said, "This Administration intends to create an environment that stimulates a private system of free-flowing information conduits." The National Performance Review (NPR) identified Agency telecommunications networks as major components of the Government Services Information Infrastructure (GSII) and key enablers for reengineering business processes. The review also recognized TCS specifically as a strategic initiative within the Executive Branch.

The Treasury Communications System becomes more than a simple network procurement to replace the Consolidated Data Network. TCS represents and facilitates a new paradigm in government business processes, the concept of virtual agencies organized around service themes. It also represents a new paradigm in networks, using the network as a massively parallel computer. TCS will be a service-based utility that will be defined dynamically by the functionality it provides. In other words, the specific use that bureaus make of TCS, and thus the functionality required, will change over time in response to user needs. Services will be available to users as needed, so that changing services to better meet mission imperatives will be simplified.

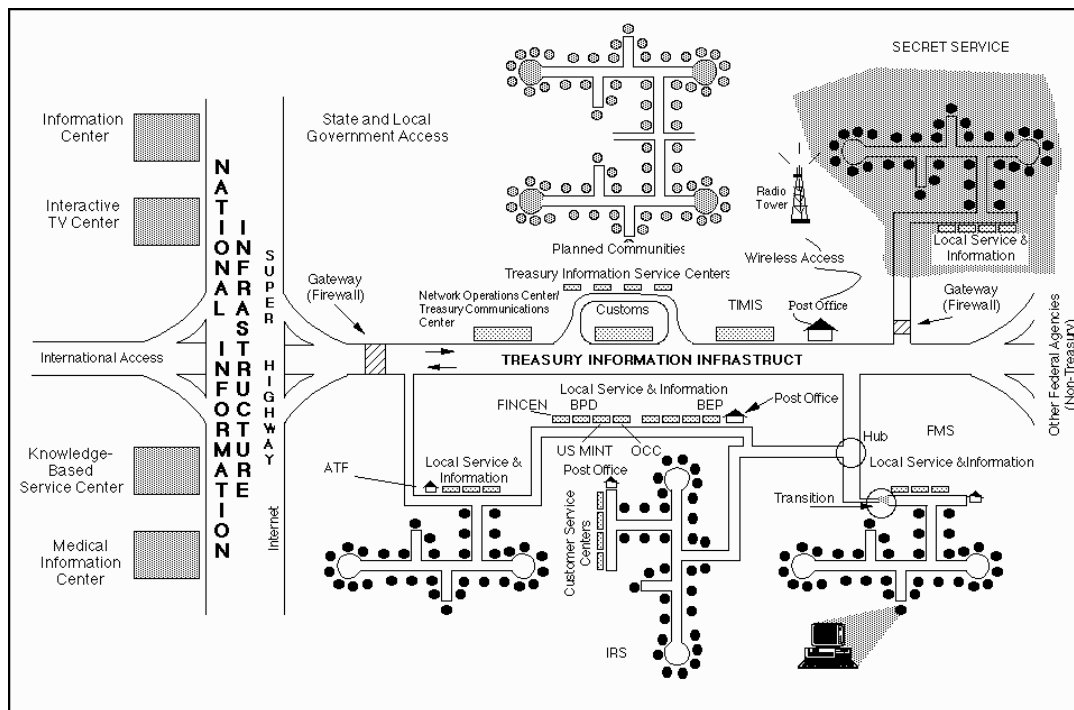


**Transportation/Telecommunications Analogy**

The Exhibit, "Transportation/Telecommunications Analogy," depicts the easily recognizable

phenomenon of shopping centers and residential communities connected by roads. The roads are analogous to telecommunications connections among and between workstations, Local Area Networks (LANs), and WANs. Roads vary in size, from parking lot driveway to highway. Wireless connections are represented by the radio tower. A resident of, or visitor to, the community finds a variety of services and products in the shopping malls. Traffic is not unrestricted. Some gateways exist to limit access to private residential communities or to certain roads. Some roads may be restricted, such as one-way streets or High Occupancy Vehicle (HOV) lanes. These restrictions are analogous to security mechanisms that may allow certain privileges (such as read and write access) on a selective basis. Within communities, individual buildings may be locked, depending on business hours or contents.

The Exhibit, "Treasury Information Infrastructure Analogy," uses the same basic design as the first but with an overlay of Treasury Department organizations. The major Departmental organizations that exist today are depicted, as well as some that are suggested in the TCS Strategic Plan. Examples of the latter are the Network Operations Center and the Treasury Information Service Centers (TISCs). Some clustering occurs to accommodate affinity groups or communities of interest, such as those relating to trade. This exhibit shows the possibility of implementing a separate management domain based on bureau mission requirements, using the U.S. Secret Service as an example. The TII connections to other information infrastructures, such as the NII, the Internet, other U.S. Government agencies, and to international access (other than Internet) are also suggested. Connections to other information infrastructures may be coordinated through TISCs.



**Treasury Information Infrastructure Analogy**



## **APPENDIX A**

### **DOCUMENTS CONSULTED FOR STRATEGIC PLAN**

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Agency Procurement Request for Phase II of the FINCEN Integrated Strategic and Tactical Support (FISTS) System, December 20, 1993

Alternatives Analysis for Phase II of the FINCEN Integrated Strategic and Tactical Support (FISTS) System, December 17, 1993

Applications Development Work Plan, USSS, CY93

Bureau of Alcohol Tobacco and Firearms Metropolitan Area Network Topology and Cost Analysis, November 18, 1992

Bureau of Alcohol Tobacco and Firearms National Laboratory Network Topology and Cost Analysis, December 4, 1992

Bureau of Alcohol, Tobacco and Firearms Law Enforcement Division Network Modernization Benefit/Cost Study (Draft)

Bureau of Alcohol, Tobacco and Firearms Telecommunications Study, November 15, 1993

Bureau of Alcohol, Tobacco, and Firearms Information Systems Plan, FY95 - FY99

Bureau of Engraving and Printing Five Year Information Systems Plan, FY95 - FY99

Bureau of Engraving and Printing Information Resource Management Strategic Plan, FY93 - FY98

Bureau of Public Debt Information Systems Plan, FY95 - FY99  
Comptroller of the Currency Information Systems Plan, FY95 - FY99,  
March 18, 1993

Creating a Government that Works Better and Costs Less, (Report of the

National Performance Review), September 7, 1993

Department of the Treasury Executive Summary of Information Systems Plans, FY95 - FY99

Draft Report on the Federal Internetworking Requirements Panel, and Selected Responses - National Institute of Standards and Technology, January 1994

Final User Requirements Analysis Report, USCS, May 24, 1993

Financial Management Information Systems Plan, FY95 - FY99

FINCEN Information Systems Plan, FY95 - FY99

FINCEN Strategic Plan, FY94 - FY88, September 24, 1993

FTS2000 Transition Support for the Office of Telecommunications Management, October 1990

Innovations in Telecommunications Management - Department of Treasury, Office of Telecommunications Management, January 1993

Internal Revenue Service Business Plan, September 27, 1993

Internal Revenue Service Executive Agent Management Plan for Local Telecommunications Services and Support, September 1992

Issues Associated with Customer LAN's on the CDN, CSC, December 3, 1993

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US MINT Information Systems Plan, FY95 - FY99

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## APPENDIX B

### TREASURY PERSONNEL INTERVIEWED

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#### ATF

Claire Todaro  
Brad Buckles  
Joe Menickelly  
Stuart Martin  
Eileen Adams  
Bill Foster  
John Brook  
Don Keith  
Art Peoples  
James Zacharias  
Diane Gerard

#### BPD

James Benton  
Dan Shannon

#### OCC

James Erdley  
Alan Guerrina  
Robert C. Smith

#### IRS

Hank Philcox  
Larry Westfall  
Judy Van Alfen  
Bruce Pitt  
Dick Oakes  
David Gaugler  
Ted Gonter  
Robert Sia

#### USCS

Arthur J. Reed  
Robert G. Janger  
Carrie Schumacker  
Deborah Daniel  
Debbie Flickinger  
Bernadette Curry  
William Tyree  
James Ryan  
Luke McCormick  
Mickey Kelly

#### TIMIS

Addaway Weeks  
Paula A. Sampson  
Mark Maring

#### FMS

John Murry  
Alan Davis  
Henry Peterson  
Bill Sandoval  
Robert Collett  
Jim Kortises  
William Greenfield  
Robert Kopsidas

**USSS**

Dennis Scott

Pat Schambach

Tom Wiesner

Art Rehkemper

Jim O'Neill

Hilda Hamed

Ron Thomsen

Jim Beck

Raymond A. Barnett

## APPENDIX C

### NON-TREASURY/INDUSTRY EXPERTS INTERVIEWED

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**Dan Blum** is a principal with Rapport Communications, a consulting firm specializing in telecommunications systems. A world-renowned expert in X.400, the international electronic messaging standard, Mr. Blum writes and distributes the electronic messaging newsletter. In addition, he recently co-authored a book, *The E-Mail Frontier* (Addison-Wesley, July 1994). Blum is an instructor and practitioner for X.400 Messaging Handling Systems, X.500 Directory Services, E-mail integration, and other seminars for government and Fortune 500 clients, and has taught at Interop, Comnet, Electronic Messaging Association, E-Mail World, Corporation for Open Systems, and Networld.

Mr. Blum's comprehensive knowledge of the telecommunications and information requirements and policies of the Treasury Department can be attributed in part to his extensive consulting work with the IRS. He continues to make substantial contributions to the IRS Tax Systems Modernization program initiatives underway for the Electronic Management Systems (EMS) and Security and Communications (SEACOS) Project Offices. He has written numerous articles and reports on topics ranging from internetworking architecture and protocols in a highly secure environment to naming, addressing, and directory synchronization implementation strategies in a complex environment.

**Harvey J. Cohen** is a Senior Consulting Partner with the Technology Applications Group of BIS, which he formed in 1988. He specializes in analyzing the key strategic and tactical marketing and technological issues that affect decision-making for high technology firms. Of particular relevance to the TCS Strategic Planning Project is Mr. Cohen's experience in researching user requirements and attitudes toward new products and services. The results of this research lead to identification of critical success factors for meeting customer needs while migrating customers to new technology platforms and business processes.

The clients for whom Mr. Cohen has completed major projects while at BIS include IBM, AT&T, Kodak, Xerox, NYNEX, Motorola, Bell Atlantic, BellSouth, Ameritech, Southwestern Bell, Bellcore, France Telecom, Southern California Edison, ICL, Cray Research, IIP, NEC, OKI, Rockwell, Thomson, and Ford. Prior to joining BIS in 1984, Cohen was associated with Data Resources Inc., where he consulted with Fortune 500 firms in support of market forecasting and strategic planning activities.

Mr. Cohen holds an S.B. in Metallurgy and Materials Science from MIT, an M.S. in Metallurgy

from Ohio State University, and an S.M. in Management from the Sloan School at MIT.

**James Herman**, a Vice President of Northeast Consulting Resources, Inc. (NCRI), is a leading expert on communications network technology and its management. His current interests include effective use of telecommunications as a strategic business asset and high performance network design and management. Recent assignments have involved communications strategy, planning, and architecture for wide-area and local networks. Mr. Herman is particularly active in the area of network and systems management. He has been involved with the development of solutions for multivendor networking since 1976, when he began work on ARPANET network management and switching software. In over 17 years of professional experience, he has managed some of the world's most complicated data networks, most notably the DARPA Internet.

In recent cases, Mr. Herman has assisted private and government organizations in all phases of planning, design, installation, and operation of multivendor computer networks based on open system standards. He also enjoys a close relationship with a number of leading vendors in the industry and has consulted on the design and marketing of network management, switching, and LAN products. He is currently helping large enterprises transition to client-server computing solutions and advanced distributed computing infrastructures.

Mr. Herman writes and lectures extensively on network technology. He is the author of over 200 technical papers, articles, and in-depth analyses. He is particularly recognized for his ability to explain and present complex technical concepts to non-technical and technical audiences. He currently offers seminars in multivendor network and system management, and design of multiprotocol internets.

Mr. Herman holds an A.B. in Mathematics, summa cum laude, from Boston College and is a member of Phi Beta Kappa.

**Joseph A. Pecar** is founder and President of Joseph A. Pecar and Associates, Inc., a telecommunications consulting firm specializing in the design, development, implementation, and integration of command, control, communications, and intelligence (C<sup>3</sup>I) systems for government and private organizations. His 35 years of systems engineering experience include large scale projects similar to the TCS. The projects he has completed include development of an architecture for the National Communications Systems and design alternatives for the Federal Telephone System (FTS2000), the Washington Inter-agency Telecommunications System (WITS), and the GSA Aggregated Switch Procurement.

In addition to designing complex systems with significant security and interoperability requirements, Mr. Pecar is the principal author of the recently published *McGraw-Hill*



*Telecommunications Factbook* and regularly teaches seminars based on its contents.

Mr. Pecar holds a B.S.E.E. from the University of Detroit and an M.S.E.E. from the University of Maryland.

**Tom McKeown** has more than 30 years experience in government and corporate strategic planning in management and technical areas applicable to the telecommunications and information technology industries. Mr. McKeown fully understands the evolving requirements for telecommunications and information technology for international and domestic markets. Mr. McKeown, who attained the rank of Captain in the U.S. Navy, has been President and CEO of T.J. McKeown and Associates, Ltd., located in Vienna, VA, in the Washington, DC area since 1987. He holds a B.S. degree in Mathematics and Masters degrees in Telecommunications Engineering and Business Administration.

**Dr. Robert E. Conley** has more than 38 years experience in information systems, including industrial development, strategic planning, technology trends and projected applications, program management, information security systems, research and development (R&D), partnerships and R&D in high technology areas. Dr. Conley's background covers computer and communications development with system applications, artificial intelligence, telecommunications, and mobile financial management in both national and international systems. Dr. Conley formerly served in the positions of Chief Scientist Command & Control Programs for the U.S. Navy and Deputy Assistant Secretary of the Department of the Treasury for Electronics Systems & Information Technology.

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## APPENDIX D

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### CORE TEAM MEMBERS

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#### GOVERNMENT

Andersen, Peter (TREAS)

Badovinac, Bob (BEP)

Craman, Brian (TREAS)

Cytryn, Darren (TIMIS)

Dubay, Charlie (USCS)

Erdly, Jim (OCC)

Flyzik, Jim (TREAS)

Fung, Wally (FMS)

Gonter, Ted (IRS)

Hamed, Hilda (USSS)

Malley, Ken (USCS)

Maring, Mark (TIMIS)

Nguyen, Paul (FINCEN)

Over, Jana (TIMIS)

Reid, Shari (USCS)

Rubenstein, Michele (FINCEN)

Sandovan, Bill (FMS)

Schuman, Ron (ATF)

Shannon, Dan (BPD)

Sia, Bob (IRS)

Skovira, Margaret (BPD)

Trotti, Gini (MINT)

Vitale, James (BEP)

Wiesner, Tom (USSS)

#### COORDINATOR/FACILITATION

Callahan, Colin (DNMI)

Conley, Robert (CAI)

Cruz, David (SRA)

Paulen, Chris (SRA)

McKeown, Tom (TJM)

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## **APPENDIX E**

### **GLOSSARY OF TERMS**

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#### **ACCESS CONTROL**

The prevention of unauthorized use of a resource, including the prevention of use of a resource in an unauthorized manner. (International Standard [IS] 7498-2, 1989)

The process of limited access to information or to resources of an Automatic Data Processing (ADP) system to only authorized users. (TD P 71-10, October 1, 1992)

#### **ADMD**

Administration Management Domain. An X.400 Message Handling System public carrier. A set of MTAs that are owned and operated by a public or private organization on behalf of others.

#### **ANSI**

American National Standards Institute. U.S. standard for the structuring of EDI data.

#### **APPLICATION**

A set of computer programs that serves a specific purpose (for example, order processing).

#### **ARP**

Address Resolution Protocol. The Internet protocol used to dynamically map Internet addresses to physical (hardware) addresses on local area networks. Limited to networks that support hardware broadcast.

#### **ATM**

Asynchronous Transfer Mode. The SONET standard for a packet switching technique which uses packets (cells) of fixed length. Also referred to as BISDN and Cell Relay.

#### **AUTHENTICATION**

A security measure designed to protect a communications system against acceptance of fraudulent transmissions or simulation by establishing the validity of a transmission, message, or originator, or a means of verifying an individual's eligibility to receive specific

categories of information. (TD P 71-10, October 1, 1992)

#### AUTHENTICATION INFORMATION

Information used to establish the validity of a claimed identity. (IS 7498-2, 1989)

#### AUTHORIZATION

The privilege granted to an individual by a designated official to access information based upon the individual's clearance and need-to-know. The granting of access rights to a user, program, or process. (TD P 71-10, October 1, 1992)

The granting of rights, which includes the granting of access based on access rights. (IS 7498-2, 1989)

#### BACKBONE

The primary connectivity mechanism of a hierarchical distributed system. All systems which have connectivity to an intermediate system on the backbone are assured of connectivity to each other.

#### BRIDGE

A device that connects two or more physical networks and forwards packets between them.

#### CMIP

Common Management Information Protocol. The OSI network management protocol.

#### CONFIDENTIALITY

A concept that applies to data that requires protection from unauthorized disclosure. (FIPS PUB 41, May 30, 1975)

The property that information is not made available or disclosed to unauthorized individuals, entities, or processes. (IS 7498-2, 1989)

#### DATA CONFIDENTIALITY

A service that can be used to provide for protection of data disclosure. (International Telegraph and Telephone Consultative Committee [CCITT] Recommendation X.509, November 1988)

**DATA INTEGRITY**

The state existing when data agrees with the source from which it is derived and when it has not either been accidentally or maliciously altered, disclosed, or destroyed. (FIPS Pub 41, May 30, 1975)

The state that exists when data is unchanged from its source and accidentally or maliciously has not been modified, altered, or destroyed. (TD P 71-10, October 19, 1992)

The property that data has not been altered or destroyed in an unauthorized manner. (IS 7498-2, 1989)

**DCE**

Distributed Computing Environment. An architecture of standard programming interfaces, conventions, and server functionalities (e.g., naming, distributed file system, remote procedure call) for distributing applications transparently across networks of heterogeneous computers).

**DIGITAL SIGNATURE**

Data appended to, or a cryptographic transformation of, a data unit that allows a recipient of the data unit to prove the source and integrity of the data unit and protect against forgery (e.g., by the recipient). (IS 7498-2, 1989)

**DIGITAL SIGNATURES**

An authentication tool that verifies the origin of a message and the identification of the sender and receiver. Can be used to resolve any authentication issue between the sender and the receiver. A digital signature is unique for every transaction.

**DIRECT USER (also referred to as a directly connected user)**

A user who is electronically connected to an Automated Information System (AIS), typically via an interactive link, and whose access is automatically limited in real time by the AIS on some basis (e.g., security clearance, or need-to-know). The directly connected user has access to the various capabilities of an AIS (e.g., database, programs, system output).

**DISA**

Defense Information Systems Agency. The new name for DCA, the Defense Communications Agency.

**DNS**

Domain Name System. The distributed name/address mechanism used in the Internet.

**EDI**

Electronic Data Interchange (EDI)--Intercompany/Trading Partner, computer-to-computer communication of data that is in a standard format and that permits the receiver to perform the function of a standard businesses transaction.

**EDI APPLICATION**

A computer process that creates and/or processes EDI messages.

**EDIFACT**

EDI for Administration, Commerce, and Trade. The acronym for the international data standard of business transactions. The UN/EDIFACT syntax has a structurally similar foundation to the ANSI X12 standards that provided its origins. The worldwide EDI community is working toward development of a single, common EDI standard. It is likely this standard will be UN/EDIFACT.

**ENCRYPTION**

The cryptographic transformation of data to produce ciphertext. (IS 7498-2, 1989)

To convert plain text into unintelligible form by means of a cryptographic system. (TD P 71-10, October 19, 1992)

**FRAME RELAY**

A recently developed switching interface which operates in packet mode. Generally regarded as the future replacement for X.25.

**FTAM (ISO 8571)**

File Transfer Access and Management (FTAM). This enables an application to read, to write, and to manage files on a remote system. Transmission of whole files (file transfer) is a subset of this service.

**GATEWAY**

The original Internet term for what is now called router, or more precisely, IP router. In modern usage, the terms "gateway" and "application gateway" refer to systems which do



translation from some native format to another. Examples include X.400 to/from RFC 822 electronic mail gateways.

#### GOSIP

Government OSI Profile. A U.S. Government procurement specification for OSI protocols. There is talk about having TCP/IP be part of GOSIP, too.

#### INTERNET

The largest internet in the world consisting of large national backbone nets (such as MILNET, NSFNET, and CREN) and a myriad of regional and local campus networks all over the world.

#### IP

Internet Protocol. The network layer protocol for the Internet protocol suite.

#### IPng

IP Next Generation. Collective term used to describe the efforts of the Internet Engineering Task Force to define a new version of the Internet Protocol (IP) which can handle large IP addresses to cope with the explosive growth of the Internet. At the time of this writing there were 3 candidate protocols for IPng: CATNIP, TUBA and SIPP. By the summer of 1994, the IETF is scheduled to have chosen Ipng.

#### ISDN

Integrated Services Digital Network. An emerging technology which is beginning to be offered by the telephone carriers of the world. ISDN combines voice and digital network services in a single medium making it possible to offer customers digital data services as well as voice connections through a single "wire." The standards that define ISDN are specified by CCITT.

#### Kerberos

A component of MIT's Project Athena. Kerberos is the security system, based on symmetric key cryptography.

#### MESSAGE HANDLING SYSTEM

A system that supports the computer-supported asynchronous transfer of documents (messages).

**MESSAGE STORE (MS)**

Provides storage for X.400 messages that cannot be delivered immediately from an MTA to a UA.

**MESSAGE TRANSFER AGENT (MTA)**

Software that moves X.400 messages from one UA or MTA to another UA or MTA.

**MIME**

Multi-purpose Internet Mail Extensions. The standard for multimedia mail contents in the Internet suite of protocols.

**NETWORK TIME PROTOCOL (NTP)**

A protocol built on top of TCP that assures accurate local time-keeping with reference to radio and atomic clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods.

**NOC**

Network Operations Center. Any center tasked with the operational aspects of a production network. These tasks include monitoring and control, troubleshooting, user assistance, and so on.

**NONREPUDIATION**

A security service that provides proof of the origin or delivery of data in order to protect the sender against the false denial by the recipient that the data has been received, or to protect the recipient against false denial by the sender that the data has been sent. (Message Handling: EDI Message Handling Service, CCITT Recommendation F.435 version 5.0)

**PRIVACY**

The right of the individuals to control or influence what information related to them may be collected and stored and by whom and to whom that information may be disclosed. (IS 7498-2, 1989)

The societal relationship between taxpayers and the Internal Revenue Service. Privacy involves the legal and ethical responsibility to protect sensitive personal information by limiting and controlling information collection and usage as well as controlling public and official access. (Privacy Project Phase III.3 Report, Assistant Commissioner Information

Systems Management Division, Information Systems Risk Management Branch, September 1992)

The ability of an individual or organization to determine whether, when, and to whom personal or organizational information is released. The right of individuals to control or influence information that is related to them in terms of who may collect or store it and to whom that information may be disclosed. (Auerbach Publications, Research Institute of America Inc., 1992)

#### PRMD

Private Management Domain. An X.400 Message Handling System private organization mail system. Example: NASAmail. A set of MTAs that are owned and operated by a private organization on its own behalf.

#### PROJECT 25

Project 25 was established to develop the standards for the next generation digital public safety radio and is sponsored by three major groups: Associated Public Safety Communications Officers, Inc. (APCO), National Association of State Telecommunications Directors, Inc. (NASTD), and Federal Law Enforcement Wireless Users Group (FLEWUG).

#### PROTOCOL

A formal description of message to be exchanged and rules to be followed for two or more systems to exchange information.

#### PTT

Post Telephone and Telegraph. Public provider of telecommunication services.

#### PUBLIC KEY ENCRYPTION (PKE)

A type of encryption that uses two mathematically-related keys. The public key is known within a group of users. The private key is known only to its owner. Contrast with secret key encryption.

#### RARP

Reverse Address Resolution Protocol. The Internet protocol a diskless host uses to find its Internet address at startup. RARP maps a physical (hardware) address to an Internet address.

**SECRET KEY ENCRYPTION**

A type of encryption that uses a single key to both encrypt and decrypt information. Also called symmetric, or single-key, encryption. Contrast with public key encryption.

**SMTP**

Simple Mail Transfer Protocol. The Internet electronic mail protocol. Defined in RFC 821, with associated message format descriptions in RFC 822.

**SNA**

Systems Network Architecture. IBM's proprietary network architecture.

**SNMP**

Simple Network Management Protocol. The network management protocol of choice for TCP/IP-based internets.

**STORE AND FORWARD MESSAGING**

Asynchronous communication system where a message transfer agent (MTA, similar to an “electronic post office”) provides intermediate storage of messages before retransmitting them to the intended recipient.

**TAI**

Telecommunications Industry Association. The principal standard-setting body for telecommunications in the U.S.

**TCP**

Transmission Control Protocol. The major transport protocol in the Internet suite of protocols providing reliable, connection-oriented, full-duplex streams. Uses IP for delivery.

**TRANSACTION SET**

A collection of information required by the recipient (Trading Partner) to perform a standard business transaction. In a standard data format, a transaction set contains a pre-defined group of segments in header, detail, and summary areas. For IRS data formats, one tax return maps into one transaction set.

**USER AGENT (UA)**

An OSI application process that represents a human user or organization in the X.400 Messaging Handling System. Creates, submits, and takes delivery of messages on the user's behalf.

#### VALUE ADDED NETWORK (VAN)

A company that provides communications services such as line speed conversion and protocol matching. Provides high-level, specialized services in addition to data transmission.

#### WORLD-WIDE WEB (WWW)

An easy but powerful global information system based on a combination of information retrieval and hypertext techniques.

#### X12

The accredited subcommittee of the American National Standards Institute whose mandate is to develop standard data formats for business transactions with cross-industry application.

#### X12 SECURITY

X12.58, Security Structures, Version 2, Draft Standard for Trial Use defines the data formats required for authentication and encryption that provide integrity, confidentiality, and verification of the security originator to the security recipient for two levels of exchange of EDI encoded transactions defined by Accredited Standards Committee X12. The two levels are the functional group level and the transaction set level. The X12.58 standard is being upgraded to support public key operations.

#### X.25

CCITT Recommendations for transmitting packets of bytes. Commonly used in lower-level network protocols in implementations of X.400.

#### X.400

A series of CCITT/ISO protocol standards for international electronic messaging interchange.

#### X.400

CCITT Recommendations for structuring and transmitting electronic mail messages.

## X.400 SECURITY

X.400 provides numerous mechanisms (security elements of service) for defense against various threats. Essentially, there are two classes of security elements: those that protect connections between systems and those that protect individual messages.

## X.435

An enhancement of the X.400 standard that provides for improved message handling and security for multiple message body parts. These body parts can contain text, graphics, raster images, speech sequences, or data. This messaging standard is particularly useful for carrying EDI interchanges.

## X.435

CCITT Recommendation that specifies the EDI Messaging System, that is, the Pedi protocol that meets the service requirements of F.435.

## X.500

CCITT Recommendations for a global distributed directory service.

## X.500 DIRECTORY SERVICES

CCITT/ISO standard for a global distributed directory that stores data about objects in a communication system (processes, entities, servers, persons, etc.). A directory service is primarily used to map names onto addresses.

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**APPENDIX F****ACRONYM LIST**

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ACE	Automated Commercial Export System
ACS	Automated Commercial System
ADP	Automatic Data Processing
ANSI X12	American National Standards Institute X12 Standards
ARP	Address Resolution Protocol
ATF	Alcohol, Tobacco and Firearms
ATM	Asynchronous Transfer Mode
BPD	Bureau of Public Debt
CDN	Consolidated Data Network
COTS	Commercial-Off-the-Shelf
DCE	Distributed Computing Environment
DDN	Defense Data Network
DISN	Defense Information Systems Network
DMI	Desktop Management Interface
DNS	Domain Name Service
EBT	Electronic Benefits Transfer
ECAT	Electronic Commerce Acquisition Team
EDI	Electronic Data Interchange
EMA	Electronic Messaging Association
FEDNET	Federal Reserve Communications System
FLEWUG	Federal Law Enforcement Wireless Users Group
FMS	Financial Management Services
FMSNET	System 90 Enterprise Network
GSII	Government Services Information Infrastructure
GITS	Government Information Technology Services
GSA	General Services Administration
HOV	High Occupancy Vehicle



IBIS	Interagency Border Inspections System
INS	Immigration and Naturalization Service
IS	Information System
ISC	Information Service Center
ISP	Information System Plans
IT	Information Technology
LAN	Local Area Network
NII	National Information Infrastructure
NIST	National Institute of Standards and Technology
NPR	National Performance Review
OSF	Open Systems Forum
OSI	Open Systems Interface
OSPF	Open Shortest Path First
RARP	Reverse Address Resolution Protocol
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
TCC	Treasury Communications Center
TCP/IP	Transmission Control Protocol/Internet Protocol
TCS	Treasury Communications System
TIA	Telecommunications Industry Association
TII	Treasury Information Infrastructure
TIMIS	Treasury Integrated Management Information System
TISC	Treasury Information Service Center
TPs	Trading Partners
TSM	Tax Systems Modernization
UN/EDIFACT	United Nations Standards for EDI for Administration, Commerce, and Trade
VANs	Value Added Networks
WAN	Wide Area Network
WRSS	Wireless/Radio Service and Support
WWW	World-wide Web